CITY OF NEWTON, MASSACHUSETTS

PURCHASING DEPARTMENT
purchasing@newtonma.gov
Fax (617) 796-1227

September 14, 2012

ADDENDUM #2

INVITATION FOR BID #13-22

INFRASTRUCTURE IMPROVEMENT PROJECT -

HAMMOND POND PARKWAY;

BEACON STEET AT LANGLEY ROAD;

BEACON STREET AT HAMMOND STREET;

CENTRE STREET AT WALNUT STREET

THIS ADDENDUM IS TO: **Answer the following Questions and Provide the following:**
Irrigation System Modified Allowance Sheet,
Revised Item Sheet 9 showing the Item 390 (Revised)

Q1. On page 35 of 316 in the project manual, it is stated that a Bidder's Certification Requirement be inserted in the bid document. No such certification is included on the bid sheet. Should the bid sheet be modified to include the bidder's certification?

A1. The Bidder's Certification Requirement is a supplement to the Bid Form, which applies to contracts greater than $50,000 (see Page 33 of 316). The Bid Form need not be modified.

Q2. Since there isn't a defined scope of work for Item 390 Irrigation System Modified can the unit of measurement for this Item be changed from lump sum to an allowance?

A2. The unit of measure has been changed to an allowance, with a value of $4,000. See attached revised Special Provision and Item Sheet.

Q3. The construction plans drawings 12-17 do not include work shown at Beacon St. and Langley Rd, Beacon St. and Hammond St. and Centre St. and Walnut St. Traffic signal plans drawings 43-52 show traffic signal and striping being performed at these locations. Is it correct that there is no roadway work being performed at these 3 locations?

A3. There is no roadway work required at these three locations.

Q4. The specification for Item 458.8 High Friction Surface Treatment states that the surface treatment is to be applied as shown on the plans. There is no indication on the plans on where this material is to be installed. Please provide clarification on where this material will be used.

A4. The high friction surface treatment in only being installed on the bike lane on the Beacon Street westbound approach and is detailed on the Traffic Plan, Sheet 49.

All other terms and conditions of this bid remain unchanged.

PLEASE ENSURE THAT YOU ACKNOWLEDGE THIS ADDENDUM ON YOUR BID FORM.

Thank you.
Purchasing Department

ITEM 390 **IRRIGATION SYSTEM MODIFIED** **ALLOWANCE**

The work under this item shall conform to the relevant provisions of Section 301 of the Standard Specifications and the following:

Where an existing irrigation system is encountered during the construction and found to conflict with the proposed work, it shall be removed and reset at new locations or modified as directed by the Engineer. The exact locations shall be determined by the Engineer in the field in consultation with the property owner or its maintenance staff.

All sprinkler heads, pipes, control valves, etc. determine to be in conflict with the construction shall be carefully removed. The Contractor shall be responsible for any damage done during the removal, temporary storage and resetting of these items and shall repair or replace the damaged item(s) as required by the Engineer at his own expense.

Sprinkler heads, pipes, control valves, etc. shall be relocated to new locations or eliminated as determined by the Engineer in consultation with the property owner or its maintenance staff. All necessary pipe and fittings shall be provided and installed by the Contractor.

The Contractor shall utilize a company experienced in the installation of lawn irrigation systems to perform the work. The existing system shall be tested in coordination with the property owner or its maintenance staff prior to disturbance of any components of the system to document its condition. Upon completion of the work, the system shall be re-tested to establish that its operation is consistent with operation prior to the work.

Irrigation system modified shall be measured for payment by each individual system modified, complete in place, operational and accepted.

Irrigation system modified will be paid for at the Contract unit price per each, which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 358 – GATE BOX ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____
ITEM 381.3 – SERVICE BOX ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER EACH	**2**	**EA**	$_____
ITEM 384.2 – CURB STOP ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**5**	**EA**	$_____
ITEM 390 – IRRIGATION SYSTEM MODIFIED THE SUM OF: __ FOUR THOUSAND_ DOLLARS AND_____ZERO _____ CENTS ($4,000_____) PER **ALLOWANCE**	**1**	**AL**	$4,000
ITEM 402 – DENSE GRADED CRUSHED STONE FOR SUB-BASE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**720**	**C.Y.**	$_____

(Items continued on next page)

CITY OF NEWTON, MASSACHUSETTS

PURCHASING DEPARTMENT
purchasing@newtonma.gov
Fax (617) 796-1227

September 5, 2012

ADDENDUM #1

INVITATION FOR BID #13-22

INFRASTRUCTURE IMPROVEMENT PROJECT -

HAMMOND POND PARKWAY;

BEACON STEET AT LANGLEY ROAD;

BEACON STREET AT HAMMOND STREET;

CENTRE STREET AT WALNUT STREET

THIS ADDENDUM IS TO:

PROVIDE 38 NEW ITEM SHEETS FOR BIDDING PURPOSES, SEE ATTACHED

1. **Revised the Bid Form to add Estimated Quantities (EST. QTY.) for each item.**
2. **Revised Item 1 unit abbreviation to A.**
3. **Added new Item 145 Drainage Structure Abandoned.**
4. **Revised Item 597 unit to FOOT.**
5. **Revised Item 831 unit to SQUARE FOOT.**
6. **Revised Item 853.2 and 853.21 descriptions.**
7. **Revised Item 854.014 and 854.016 descriptions.**
8. **Revised Item 854.3 unit to SQUARE FOOT.**
9. **Revised Item 999.001 Allowance Cost.**

All other terms and conditions of this bid remain unchanged.

PLEASE ENSURE THAT YOU ACKNOWLEDGE THIS ADDENDUM ON YOUR BID FORM.

Thank you.
Purchasing Department

ITEM SHEET PAGE 1

The Contractor shall insert prices for each item in ink, in both words and figures, and is to show a total bid price. In the event a discrepancy between the written words and figures, the written words shall govern. In the event an error in the bidders total bid price, the corrected total bid obtained by the summation of the products of the unit prices multiplied by the respective quantities shall stand as the bidder's total bid price.

The Contractor is required to review any related plans, conduct a full site review, and read all the provisions in the document before inserting prices, and is further advised to make his own determination as to the accuracy of the estimated quantities before inserting bid prices.

The estimated quantities shown here are based solely upon a reasonable assessment of the project parameters, thus the Contractor is advised that the actual quantities may vary substantially as field conditions necessitate.

NOTICE: In accordance with MGL Chapter 303 of the Acts of 2008 this bid contains price adjustments for Fuel (combination of Gasoline & Diesel). It is the bidder's responsibility to familiarize themselves with this price adjustment program prior to entering a bid.

BASE BID

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
Item: **0.303FC-RE - FUEL COSTS FOR PAVEMENT MILLING, FINE GRADING AND COMPACTING*** • *Bidder's may elect **NOT** to bid the cost of fuel(s) separately by inserting the term **N/A** *(i.e. Not Applicable)* in all entry lines of this Item .303FC. This is **a mandatory requirement** to verify the Contractor has waived their option to bid the cost of fuel(s) separately and has instead elected to factor their collective fuel costs for the overlay operations into the bid price of **Items 129 and 170.** • **Contractor's choosing to bid this line item must NOT include the cost of fuel in Items 129 and 170.** ---------- *The City of Newton reserves the right to validate this information before and after awarding the bid.* **0.303FC-RE** = total combined number of gallons of Fuel (Diesel &Gasoline) to prepare **One Square Yard** of roadway surface. (IN WORDS)_____ Gallons Per Square Yard (IN FIGURES)_____ Gallons Per Square Yard (_____**Gallons per SQUARE YARD.**) **x** (**$ 3.2875 /Gallon**) **x** ***^Base Price^*** ***of diesel and gasoline (BPF)*** ***Per MassDOT Highway Division***		**S.Y.**	Note: This factored value is for the **Comparison of Bids Only**. (See Spec. Prov.) $_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
Item: **0.303FC-RP - FUEL COSTS FOR FURNISHING AND INSTALLING HOT MIX ASPHALT PAVEMENT*** • *Bidder's may elect **NOT** to bid the cost of fuel(s) separately by inserting the term **N/A** *(i.e. Not Applicable)* in all entry lines of this Item .303FC. This is **a mandatory requirement** to verify the Contractor has waived their option to bid the cost of fuel(s) separately and has instead elected to factor their collective fuel costs for the overlay operations into the bid price of **Items 420, 460, 472, 702 and 703.** • **Contractor's choosing to bid this line item must NOT include the cost of fuel in Items 420, 460, 472, 702 and 703.** ---------- For a bid to be considered responsive under this item the Contractor **MUST** supply the following information: Address of Batching Plant: _____ _____ The One –Way shortest distance listed by MapQuest (www.mapquest.com) from the batching plant to Newton City Hall, 1000 Commonwealth Ave., Newton Centre, MA 02459 _____ Miles *The City of Newton reserves the right to validate this information before and after awarding the bid.* **0.303FC-RP** = total combined number of gallons of Fuel (Diesel & Gasoline) to supply, deliver & install One Ton of Hot Mix Asphalt. (IN WORDS)_____ Gallons Per Ton (IN FIGURES)_____ Gallons Per Ton (**_____Gallons per Ton**) **x** (**$ 3.2875 Gallon**) **x** ***^Base Price^*** ***of diesel and gasoline (BPF)*** ***Per MassDOT Highway Division***		**TON**	Note: This factored value is for the **Comparison of Bids Only**. (See Spec. Prov.) $_____
Item: 0.303LA- DIFFERENTIAL FOR LIQUID ASPHALT (Informational Note: For the purpose of this program One (1) Ton of Hot Mix Asphalt shall contain six-hundredths (0.06) Ton of Liquid Asphalt). The **Base Price** for Liquid Asphalt is: **$ 610.00** Per **Ton of Liquid Asphalt** **^Base Price of Liquid Asphalt (BPLA)^** **Per MassDOT Highway Division**	**N/A**	**N/A**	The Base Price (BPLA) shown here shall be used to determine the monthly price differential (See Spec. Prov.) $___N/A___

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 101 - CLEARING AND GRUBBING THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **ACRE**	**0.5**	**A**	$_____
ITEM 102.51 – INDIVIDUAL TREE PROTECTION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**10**	**EA**	$_____
ITEM 103 – TREE REMOVED – DIAMETER UNDER 24 INCHES THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 120.1 – UNCLASSIFIED EXCAVATION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**5,400**	**C.Y.**	$_____
ITEM 121 – CLASS A ROCK EXCAVATION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**5**	**C.Y.**	$_____
ITEM 125 – TOPSOIL EXCAVATED AND STACKED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**720**	**C.Y.**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 129 – PAVEMENT MILLING THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE YARD**	**9,100**	**S.Y.**	$_____
ITEM 141.1 – TEST PIT FOR EXPLORATION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**60**	**C.Y.**	$_____
ITEM 142 – CLASS B TRENCH EXCAVATION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**190**	**C.Y.**	$_____
ITEM 144 – CLASS B ROCK EXCAVATION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**5**	**C.Y.**	$_____
ITEM 145 – DRAINAGE STRUCTURE ABANDONED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**6**	**EA**	$_____
ITEM 146 – DRAINAGE STRUCTURE REMOVED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**3**	**EA**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 150 – ORDINARY BORROW THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**20**	**C.Y.**	$_____
ITEM 151– GRAVEL BORROW THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**5,670**	**C.Y.**	$_____
ITEM 153 – CONTROLLED DENSITY FILL - EXCAVATABLE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**60**	**C.Y.**	$_____
ITEM 154 – SAND BORROW THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**90**	**C.Y.**	$_____
ITEM 156 – CRUSHED STONE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **TON**	**481**	**TON**	$_____
ITEM 170 – FINE GRADING AND COMPACTING THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE YARD**	**16,700**	**S.Y.**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	**EST. QTY.**	**UNIT**	TOTAL COST
ITEM 187.3 – REMOVAL AND DISPOSAL OF DRAINAGE STRUCTURE SEDIMENTS THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**50**	**C.Y.**	$_____
ITEM 201 – CATCH BASIN THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**25**	**EA**	$_____
ITEM 202 – MANHOLE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**4**	**EA**	$_____
ITEM 203 – SPECIAL MANHOLE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____
ITEM 220–DRAINAGE STRUCTURE ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**10**	**EA**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 220.3 – DRAINAGE STRUCTURE CHANGE IN TYPE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**4**	**EA**	$_____
ITEM 220.5 – DRAINAGE STRUCTURE REMODELED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**9**	**EA**	$_____
ITEM 220.7 – SANITARY STRUCTURE ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 220.8 – SANITARY STRUCTURE REMODELED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 221– FRAME AND COVER THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**8**	**EA**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 222.1 – FRAME AND GRATE - MASSDOT CASCADE TYPE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**23**	**EA**	$_____
ITEM 223 – FRAME AND GRATE (OR COVER) REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 223.2 – FRAME AND GRATE (OR COVER) REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**6**	**EA**	$_____
ITEM 241.12 – 12 INCH REINFORCED CONCRETE PIPE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**470**	**FT**	$_____
ITEM 243.12 – 12 INCH REINFORCED CONCRETE PIPE CLASS IV THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**60**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 358 – GATE BOX ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____
ITEM 381.3 – SERVICE BOX ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER EACH	**2**	**EA**	$_____
ITEM 384.2 – CURB STOP ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**5**	**EA**	$_____
ITEM 390 – IRRIGATION SYSTEM MODIFIED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**LS**	$_____
ITEM 402 – DENSE GRADED CRUSHED STONE FOR SUB-BASE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**720**	**C.Y.**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 420 – HOT MIX ASPHALT BASE COURSE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **TON**	**1,510**	**TON**	$_____
ITEM 431– HIGH EARLY STRENGTH CEMENT CONCRETE BASE COURSE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE YARD**	**180**	**S.Y.**	$_____
ITEM 440 – CALCIUM CHLORIDE FOR ROADWAY DUST CONTROL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **POUND**	**10,100**	**LB**	$_____
ITEM 443 – WATER FOR ROADWAY DUST CONTROL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **1,000 GALLONS**	**110**	**MGL**	$_____
ITEM 458.8 – HIGH FRICTION SURFACE TREATMENT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE YARD**	**100**	**S.Y.**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 460 – HOT MIX ASPHALT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **TON**	**3,300**	**TON**	$_____
ITEM 464 – BITUMEN FOR TACK COAT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **GALLON**	**1,800**	**GAL**	$_____
ITEM 464.5 – HOT POURED RUBBERIZED ASPHALT SEALER THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**10,500**	**FT**	$_____
ITEM 472 – HOT MIX ASPHALT FOR MISCELLANEOUS WORK THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **TON**	**500**	**TON**	$_____
ITEM 482.3 – SAWING ASPHALT PAVEMENT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**6,400**	**FT**	$_____
ITEM 504 – GRANITE CURB TYPE VA4 – STRAIGHT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**7,040**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 504.1 – GRANITE CURB TYPE VA4 – CURVED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**1,080**	**FT**	$_____
ITEM 509 – GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS – STRAIGHT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**110**	**FT**	$_____
ITEM 509.1 – GRANITE TRANSITION CURB FOR WHEELCHAIR RAMPS – CURVED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**120**	**FT**	$_____
ITEM 511.1 – GRANITE EDGING TYPE SB – STRAIGHT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**150**	**FT**	$_____
ITEM 512.1 – SLOPED GRANITE EDGING TYPE SB (RADIUS 10 FEET OR LESS) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**30**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 514 – GRANITE CURB INLET - STRAIGHT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**14**	**EA**	$_____
ITEM 515 – GRANITE CURB INLET - CURVED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**5**	**EA**	$_____
ITEM 516 – GRANITE CURB CORNER TYPE A THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____
ITEM 517 – GRANITE CURB CORNER TYPE B THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**13**	**EA**	$_____
ITEM 580 – CURB REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**6,490**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 581 – CURB INLET REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**6**	**EA**	$_____
ITEM 582 – CURB CORNER REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____
ITEM 583 – EDGING REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**40**	**FT**	$_____
ITEM 590 – CURB REMOVED AND STACKED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**650**	**FT**	$_____
ITEM 594 – CURB REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**1,220**	**FT**	$_____
ITEM 595 – CURB INLET REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 596 – CURB CORNER REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**4**	**EA**	$_____
ITEM 597 – EDGING REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**100**	**FT**	$_____
ITEM 620.1 – STEEL W BEAM HIGHWAY GUARD (SINGLE FACED) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**40**	**FT**	$_____
ITEM 621.1 – STEEL W BEAM HIGHWAY GUARD (DOUBLE FACED) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**70**	**FT**	$_____
ITEM 621.3 – STEEL W BEAM HIGHWAY GUARD - CURVED (DOUBLE FACED) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**120**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 627.1 – STEEL W BEAM TERMINAL SECTION (SINGLE FACED) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 627.2 – STEEL W BEAM TERMINAL SECTION (DOUBLE FACED) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 627.8 – STEEL BEAM HIGHWAY GUARD TANGENT END TREATMENT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 635.1 – HIGHWAY GUARD REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**320**	**FT**	$_____
ITEM 644.148 – 48-INCH CHAIN LINK FENCE (STW) VINYL COATED (LINE POST OPTION) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**180**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 652.048 – 48-INCH CHAIN LINK FENCE END POST THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____
ITEM 653.048 – 48-INCH CHAIN LINK FENCE CORNER OR INTERMEDIATE BRACE POST THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 657 – TEMPORARY FENCE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**750**	**FT**	$_____
ITEM 697.1 – SILT SACK THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**20**	**EA**	$_____
ITEM 701 – CEMENT CONCRETE SIDEWALK THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE YARD**	**40**	**S.Y.**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 701.2 – CEMENT CONCRETE WHEELCHAIR RAMP THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE YARD**	**190**	**S.Y.**	$_____
ITEM 702 – HOT MIX ASPHALT WALK SURFACE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **TON**	**180**	**TON**	$_____
ITEM 703 – HOT MIX ASPHALT DRIVEWAY THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **TON**	**110**	**TON**	$_____
ITEM 734 – SIGN REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	$_____
ITEM 748 – MOBILIZATION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	$_____
ITEM 751 – LOAM BORROW THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**190**	**C.Y.**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 752 – TOPSOIL REHANDLED AND SPREAD THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**720**	**C.Y.**	$_____
ITEM 756 – NPDES STORMWATER POLLUTION PREVENTION PLAN THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	$_____
ITEM 765 – SEEDING THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE YARD**	**4,810**	**S.Y.**	$_____
ITEM 767.4 – WOOD CHIP MULCH THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**5**	**C.Y.**	$_____
ITEM 767.6 – AGED PINE BARK MULCH THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **CUBIC YARD**	**5**	**C.Y.**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 767.8 – BALES OF HAY FOR EROSION CONTROL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**75**	**EA**	$_____
ITEM 769 – PAVEMENT MILLING MULCH UNDER GUARDRAIL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**240**	**FT**	$_____
ITEM 776.561 – MAPLE – RED - 'RED SUNSET' 3.5-4 INCH CALIPER THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**36**	**EA**	$_____
ITEM 804.2 – 2 INCH ELECTRICAL CONDUIT TYPE NM-PLASTIC (UL) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**980**	**FT**	$_____
ITEM 804.3 – 3 INCH ELECTRICAL CONDUIT TYPE NM-PLASTIC (UL) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**4,651**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 806.3 – 3 INCH ELECTRICAL CONDUIT TYPE RM-GALVANIZED STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	30	**FT**	$_____
ITEM 806.4 – 4 INCH ELECTRICAL CONDUIT TYPE RM-GALVANIZED STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	45	**FT**	$_____
ITEM 811.22 – ELECTRIC HANDHOLE – SD2.022 THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**35**	**EA**	$_____
ITEM 811.31 – PULL BOX 12 X 12 INCHES - SD2.031 THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**16**	**EA**	$_____
ITEM 811.36 – ELECTRIC MANHOLE ADJUSTED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**12**	**EA**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 811.391– ELECTRIC HANDHOLE REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**7**	**EA**	$_____
ITEM 812.10 – LIGHT STANDARD FOUNDATION SD3.010 THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**31**	**EA**	$_____
ITEM 812.20 – LIGHTING LOAD CENTER FOUNDATION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	$_____
ITEM 813.30 – WIRE TYPE 7 NO. 10 GENERAL PURPOSE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**20**	**FT**	$_____
ITEM 813.32 – WIRE TYPE 7 NO. 6 GENERAL PURPOSE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**18,060**	**FT**	$_____
ITEM 813.34 – WIRE TYPE 7 NO. 2 GENERAL PURPOSE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**180**	**FT**	$_____

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 813.52 – WIRE TYPE 10 - #8 GROUNDING AND BONDING THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**17,070**	**FT**	$_____
ITEM 813.71 – GROUND ROD 8 FT. LONG THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**60**	**EA**	$_____
ITEM 815.1 – TRAFFIC SIGNAL LOCATION NO. N2 (HAMMOND POND PARKWAY@ RTE 9 WB RAMPS) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 815.2 – TRAFFIC SIGNAL LOCATION NO. N3 (HAMMOND POND PARKWAY@ CH SHOPPING CTR DR) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 816.01 – TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. N1 (HAMMOND POND PARKWAY@ RTE 9 EB RAMPS) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 816.02 – TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. N4 (BEACON STREET @ LANGLEY ROAD) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 816.03 – TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. N5 (BEACON STREET @ HAMMOND STREET) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 816.04 – TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. N6 (CENTRE STREET @ WALNUT STREET) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 820.10 - HIGHWAY LIGHTING - ROADWAY THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____)PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 820.16 – ROADWAY STREET LIGHT WITH ONE LUMINAIRE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**25**	**EA**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 820.17 – ROADWAY STREET LIGHT WITH TWO LUMINAIRES THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**6**	**EA**	**$_____**
ITEM 823.60 - HIGHWAY LIGHTING LOAD CENTER THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 827.21 – 24 INCH WARNING CLUSTER (H1-2) – ALUMINUM PANEL (TYPE A) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**4**	**EA**	**$_____**
ITEM 829 – ROADSIDE GUIDE SIGN (G) – ALUMINUM PANEL (TYPE B) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**292**	**S.F.**	**$_____**
ITEM 831 – ROADSIDE GUIDE SIGN (D6/D8) – ALUMINUM PANEL (TYPE A) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**37**	**S.F.**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 831.2 – ROADSIDE GUIDE SIGN REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	**$_____**
ITEM 832 – WARNING-REGULATORY AND ROUTE MARKER – ALUM. PANEL (TYPE A) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**613**	**S.F.**	**$_____**
ITEM 833.5 – DEMOUNTABLE REFLECTORIZED DELINEATOR – GUARD RAIL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**15**	**EA**	**$_____**
ITEM 833.7 –DELINEATION FOR GUARD RAIL TERMINI THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**3**	**EA**	**$_____**
ITEM 841.1 – SUPPORTS FOR GUIDE SIGN (D6 W/D8-5 INCH TUBULAR POST) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 844.101 – SUPPORTS FOR GUIDE SIGN (G1) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 844.102 – SUPPORTS FOR GUIDE SIGN (G2) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 844.103 – SUPPORTS FOR GUIDE SIGN (G3) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 844.104 – SUPPORTS FOR GUIDE SIGN (G4) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 844.105 – SUPPORTS FOR GUIDE SIGN (G5) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 844.106 – SUPPORTS FOR GUIDE SIGN (G6) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 847.1 – SIGN SUP (N/GUIDE) + RTE MKR W/1 BRKWAY POST ASSEMBLY - STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**70**	**EA**	**$_____**
ITEM 848.1 – SIGN SUP (N/GUIDE) + RTE MKR W/2 BRKWAY POST ASSEMBLIES - STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**7**	**EA**	**$_____**
ITEM 851 – SAFETY CONTROLS FOR CONSTRUCTION OPERATIONS THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **UNIT DAY**	**165**	**UD**	**$_____**
ITEM 852 – SAFETY SIGNING FOR CONSTRUCTION OPERATIONS THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**1,510**	**SF**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 853.1– PORTABLE BREAKAWAY BARRICADE TYPE III THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**17**	**EA**	**$_____**
ITEM 853.2 – TEMPORARY BARRIER THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**200**	**FT**	**$_____**
ITEM 853.21– TEMPORARY BARRIER REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**400**	**FT**	**$_____**
ITEM 853.42– TEMP. IMP. ATTENUATOR FOR SHOULDER, CAPABLE OF REDIRECTION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	**$_____**
ITEM 853.421– TEMP. IMP. ATTENUATOR FOR SHOULDER, CAPABLE OF REDIRECTION R&R THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**4**	**EA**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 853.44 – TEMP. IMP. ATTENUATOR FOR MEDIAN, CAPABLE OF REDIRECTION THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	**$_____**
ITEM 853.441 – TEMP. IMP. ATTENUATOR FOR MEDIAN, CAPABLE OF REDIRECTION, R&R THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	**$_____**
ITEM 854.014 – TEMPORARY PAVING MARKINGS – 4 INCH (PAINTED) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**6,600**	**FT**	**$_____**
ITEM 854.016 – TEMPORARY PAV MARKINGS – 6 INCH (PAINTED) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**3,500**	**FT**	**$_____**
ITEM 854.034 – TEMPORARY PAVEMENT MARKINGS – 4 INCH (REMOVABLE TAPE) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**4,100**	**FT**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 854.036 – TEMPORARY PAVEMENT MARKINGS – 6 INCH (REMOVABLE TAPE) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**1,000**	**FT**	**$_____**
ITEM 854.1– PAVEMENT MARKING REMOVAL – PAINT THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**990**	**S.F.**	**$_____**
ITEM 854.2 – PAVEMENT MARKING REMOVAL – THERMOPLASTIC THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**2,180**	**S.F.**	**$_____**
ITEM 854.3 – PAVEMENT MARKING REMOVAL – TAPE THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**1,860**	**S.F.**	**$_____**
ITEM 856 – SPECIAL LIGHTING UNIT – (FLASHING ARROW) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **UNIT DAY**	**400**	**UD**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 856.12 – PORTABLE CHANGEABLE MESSAGE SIGN THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **UNIT DAY**	**400**	**UD**	**$_____**
ITEM 859 – REFLECTORIZED DRUM THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **DRUM DAY**	**24,800**	**DD**	**$_____**
ITEM 864.04 – PAVEMENT ARROW AND LEGENDS – REFL. WHITE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**1,890**	**S.F.**	**$_____**
ITEM 865.1 – CROSSWALKS AND STOP LINES – REFL. WHITE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**1,750**	**S.F.**	**$_____**
ITEM 866.04 – 4 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**5,900**	**FT**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 866.06 – 6 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**2,900**	**FT**	**$_____**
ITEM 866.08 – 8 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**170**	**FT**	**$_____**
ITEM 866.12 – 12 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**420**	**FT**	**$_____**
ITEM 867.04 – 4 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**3,700**	**FT**	**$_____**
ITEM 867.06 – 6 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**1,500**	**FT**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 867.08 – 8 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **FOOT**	**70**	**FT**	**$_____**
ITEM 874 – STREET NAME SIGN THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**13**	**EA**	**$_____**
ITEM 874.2 – TRAFFIC SIGN REMOVED AND RESET THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**5**	**EA**	**$_____**
ITEM 874.41 – TRAFFIC SIGN REMOVED AND DISCARDED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**37**	**EA**	**$_____**
ITEM 874.7 – MISCELLANEOUS SIGNS REMOVED AND STACKED THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**1**	**EA**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 999.001 – POLICE SERVICES THE SUM OF: _____EIGHTY THOUSAND_____ DOLLARS AND___ZERO_____ CENTS ($__80,000_____) PER **ALLOWANCE**	**1**	**ALW**	**$ 80,000**

SUBTOTAL BASE BID: $_____

ADD ALTERNATE BID

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 815.1-A – TRAFFIC CONTROL SIGNAL LOCATION NO. C2 (RTE 9 @ LANGLEY RD) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 816.01-A – TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. C1 (RTE 9 @ CHESTNUT HILL SQUARE AND THE MALL AT CHESTNUT HILL DRIVES) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 827.21-A – 24 INCH WARNING CLUSTER (H1-2) – ALUMINUM PANEL (TYPE A) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**4**	**EA**	**$_____**
ITEM 828.1-A – OVERHEAD GUIDE SIGN – ALUMINUM PANEL (TYPE B) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**62**	**S.F.**	**$_____**
ITEM 831-A – ROADSIDE GUIDE SIGN (D6/D8)– ALUMINUM PANEL (TYPE A) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**123**	**S.F.**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 832-A – WARNING – REGULATORY AND ROUTE MARKER ALUMINUM PANEL (TYPE A) THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **SQUARE FOOT**	**635**	**S.F.**	**$_____**
ITEM 840.101-A – SUPPORTS FOR OVERHEAD GUIDE SIGN (OD-1) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **LUMP SUM**	**1**	**L.S.**	**$_____**
ITEM 841.1-A – SUPPORTS FOR GUIDE SIGN (D6 W/D8-5 INCH TUBULAR POST) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	**$_____**
ITEM 841.2-A – SUPPORTS FOR GUIDE SIGN (D6-5 INCH TUBULAR POST) STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**2**	**EA**	**$_____**
ITEM 847.1-A – SIGN SUP (N/GUIDE)+RTE MKR W/1 BRKWAY POST ASSEMBLY – STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**47**	**EA**	**$_____**

(Items continued on next page)

ITEM DESCRIPTION & BID PRICE	EST. QTY.	UNIT	TOTAL COST
ITEM 848.1-A – SIGN SUP (N/GUIDE)+RTE MKR W/2 BRKWAY POST ASSEMBLIES – STEEL THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**10**	**EA**	**$_____**
ITEM 874-A – STREET NAME SIGN THE SUM OF: _____ DOLLARS AND_____ CENTS ($_____) PER **EACH**	**12**	**EA**	**$_____**

SUBTOTAL ADD ALTERNATE BID:

$_____

TOTAL CONTRACT BID: **$_____**

The Total for all items on this page must be inserted in Paragraph "C" of the BID FORM.

END OF SECTION

Infrastructure Improvement Project

Bid Set - Supplemental Information

August 17, 2012

Hammond Pond Parkway
Beacon St at Langley Rd
Beacon St at Hammond St
Centre St at Walnut St

Newton, Massachusetts

Add Alt-Plans & Special Provisions

Add Alt-Sign Bridge Exploration Location Plan & Boring Logs

Subsurface Utility Investigation

Suggested Construction Phasing- The Mall at Chestnut Hill East Driveway

NSTAR Work Order Application

Prepared by:

VAI **Vanasse & Associates, Inc.**
Transportation Engineers & Planners
10 New England Business Center Drive
Suite 314
Andover, MA 01810-1066

INFRASTRUCTURE IMPROVEMENTS PROJECT

HAMMOND POND PARKWAY; BEACON STREET AT LANGLEY ROAD;
BEACON STREET AT HAMMOND STREET; CENTRE STREET AT WALNUT STREET

NEWTON, MASSACHUSETTS

The following information is provided as a supplement to the Bid Set Plans and Special Provisions:

Add Alt – Plans and Special Provisions
Add Alt – Sign Bridge Exploration Location Plan & Boring Logs
Subsurface Utility Investigation
Suggested Construction Phasing – The Mall at Chestnut Hill East Driveway
NSTAR Work Order Application

ADD ALT – PLANS AND SPECIAL PROVISIONS

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	32	108
PROJECT FILE NO. -------			

SIGNING AND PAVEMENT MARKING PLAN

NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC UNLESS OTHERWISE NOTED.
2. PROPOSED MARKINGS (LEGENDS AND ARROWS) SHALL BE INSTALLED ACCORDING TO MASSDOT STANDARD.
3. MAINTAIN A 3.5 FT MINIMUM CLEAR SIDEWALK AT ALL PROPOSED SIGN INSTALLATIONS.
4. ALL MOUNTED SIGNS SHALL USE THE MOUNTING HEIGHT OF 7 FEET AS SPECIFIED IN THE 2009 MUTCD SECTION 2A.18 AND ILLUSTRATED IN FIGURE 2A–2.
5. SLOTTED PAVEMENT MARKERS SHALL BE INSTALLED AS SHOWN ALONG THE ENTIRE LENGTH OF THE BOYLSTON STREET CORRIDOR IN ACCORDANCE WITH MASSDOT DETAIL TR.6.3 AND TR.6.5 AND IN ACCORDANCE WITH SPECIAL PROVISIONS.

LEGEND:

◁ ONE–WAY WHITE SLOTTED PAVEMENT MARKER

ADD ALTERNATE

THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED REGULATORY, WARNING AND ROUTE MARKER SIGNS AND SUPPORTS, GROUND MOUNTED GUIDE SIGNS AND SUPPORTS, OVERHEAD SIGNS AND SUPPORTS, AND SIGN SUPPORT FOUNDATION DESIGNS. FOR WORK WITHIN THE CITY OF NEWTON ONLY.

AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS AND DESIGNING THE FOUNDATIONS.

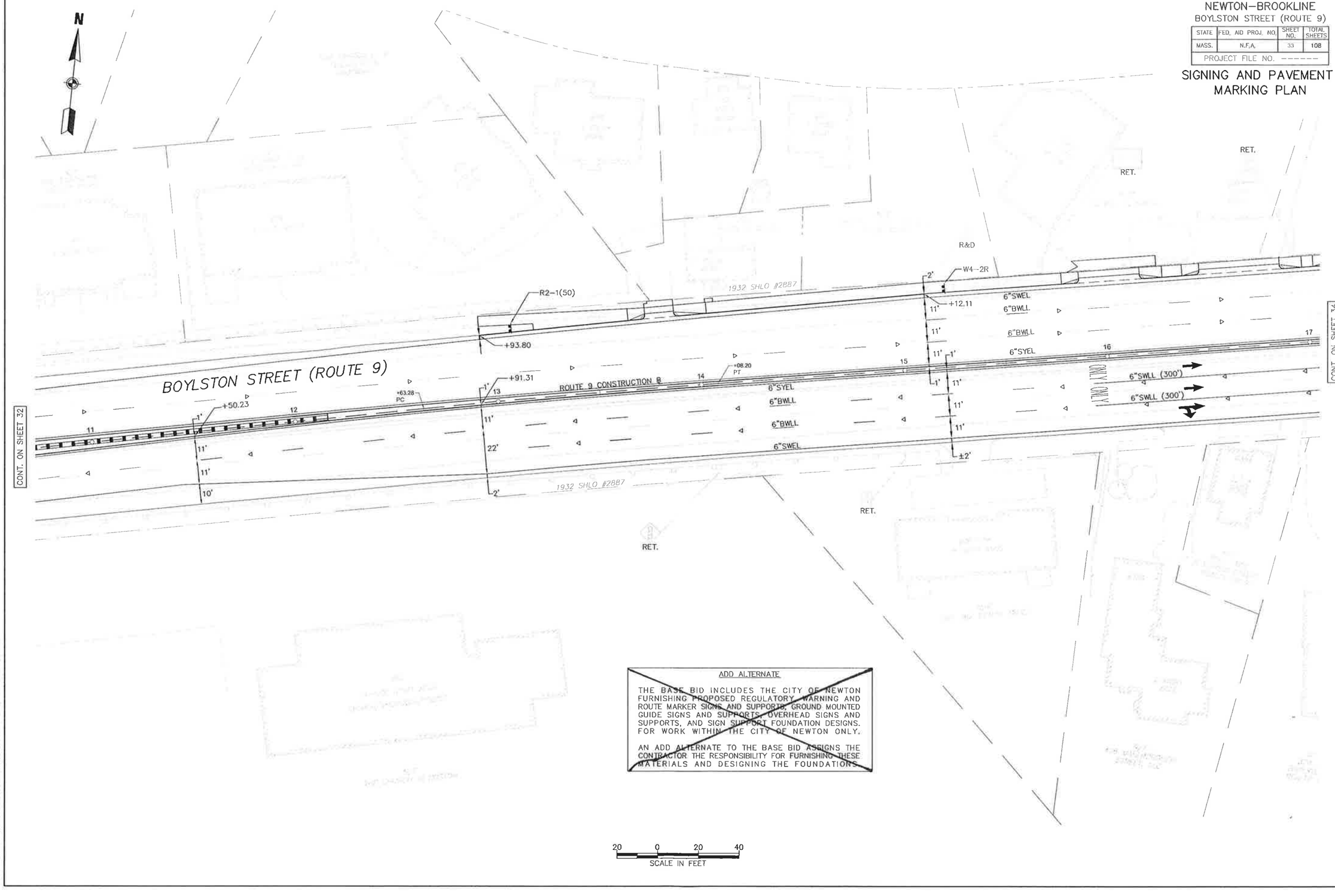
20 0 20 40
SCALE IN FEET

NEWTON–BROOKLINE

BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	33	108
PROJECT FILE NO. ------			

SIGNING AND PAVEMENT MARKING PLAN



ADD ALTERNATE

THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED REGULATORY, WARNING AND ROUTE MARKER SIGNS AND SUPPORTS, GROUND MOUNTED GUIDE SIGNS AND SUPPORTS, OVERHEAD SIGNS AND SUPPORTS, AND SIGN SUPPORT FOUNDATION DESIGNS. FOR WORK WITHIN THE CITY OF NEWTON ONLY.

AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS AND DESIGNING THE FOUNDATIONS.

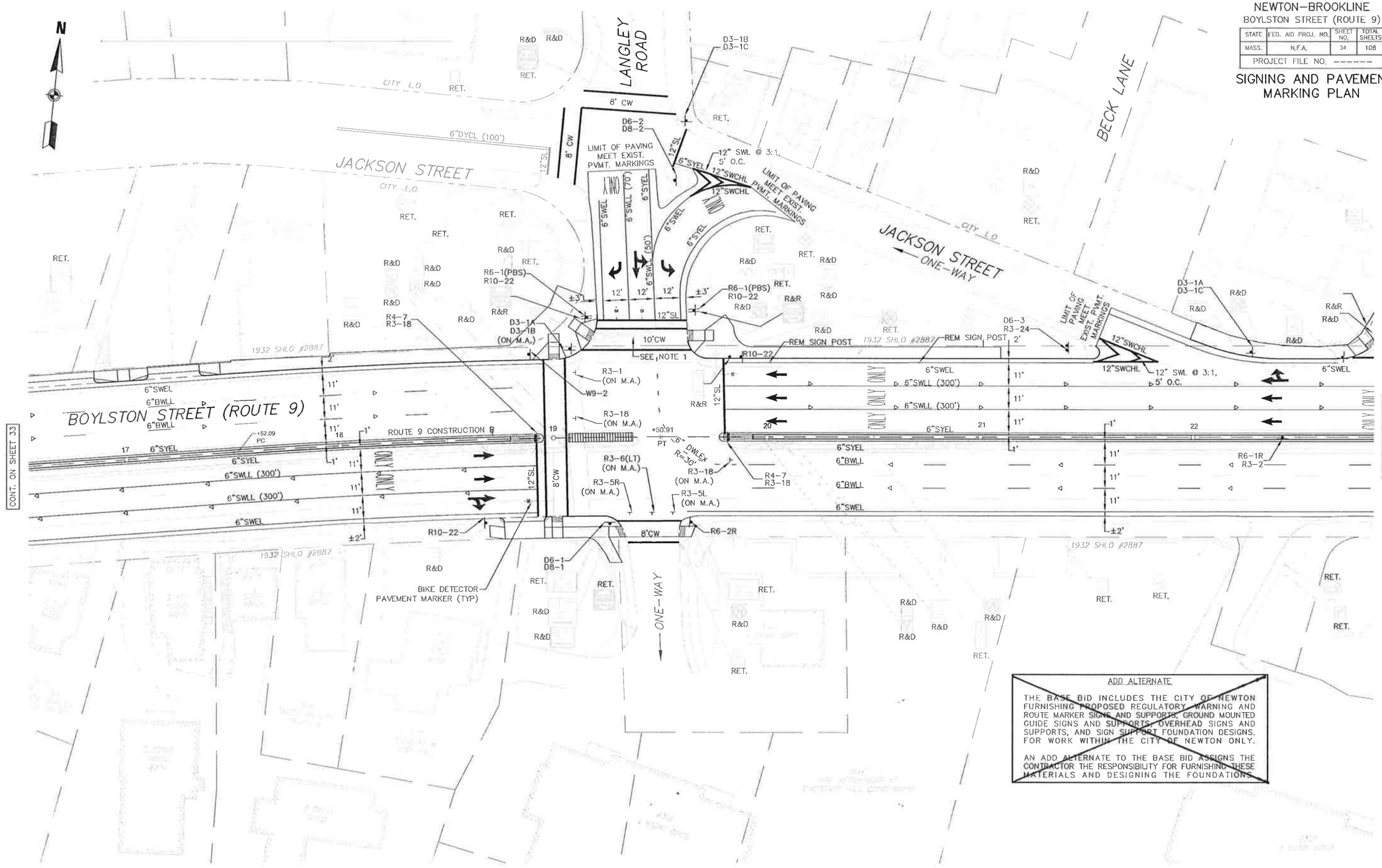
20 0 20 40

SCALE IN FEET

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	34	108
PROJECT FILE NO. -------			

SIGNING AND PAVEMENT MARKING PLAN



ADD ALTERNATE

THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED REGULATORY, WARNING AND ROUTE MARKER SIGNS AND SUPPORTS, GROUND MOUNTED GUIDE SIGNS AND SUPPORTS, OVERHEAD SIGNS AND SUPPORTS, AND SIGN SUPPORT FOUNDATION DESIGNS. FOR WORK WITHIN THE CITY OF NEWTON ONLY.

AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS AND DESIGNING THE FOUNDATIONS.

NOTES:

1. REMOVE EXISTING OVERHEAD SIGN STRUCTURE AND FOUNDATIONS. SEE SPECIAL PROVISIONS.

20 0 20 40
SCALE IN FEET

NEWTON–BROOKLINE

BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	35	108
PROJECT FILE NO. -------			

SIGNING AND PAVEMENT MARKING PLAN

N

JOHN STREET

R&D

LIMIT OF WORK MEET EXIST. PVMT. MARKINGS

R7–1L

R&R

R&D

W14–1

12"SL

8' CW

RET.

R3–23

1932 SHLO #2887

R&R

R&D

6"SWEL

6"SWLL (300')

D3–1A

D3–1D

R6–1R

R3–2

ONLY

6"SWLL (300')

23

24

ROUTE 9 CONSTRUCTION B

25

26

6"SYEL

6"BWLL

11'

27

1'

28

CONT. ON SHEET 34

CONT. ON SHEET 36

BOYLSTON STREET (ROUTE 9)

+77.92

±2' (MIN.)

±7'

12" SWL @ 45°, 15' O.C.(TYP)

H1–2

4'

REM POST

D3–1A

D3–1E

6"SYEL

8' CW

3'

12"SL

R1–1

R3–5R

2' (MIN.)

15'

12' (MIN.)

R7–1R

R4–7

LIMIT OF WORK MEET EXIST. PVMT. MARKINGS

CITY LO

FLORENCE STREET

ADD ALTERNATE

THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED REGULATORY, WARNING AND ROUTE MARKER SIGNS AND SUPPORTS, GROUND MOUNTED GUIDE SIGNS AND SUPPORTS, OVERHEAD SIGNS AND SUPPORTS, AND SIGN SUPPORT FOUNDATION DESIGNS. FOR WORK WITHIN THE CITY OF NEWTON ONLY.

AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS AND DESIGNING THE FOUNDATIONS.

20 0 20 40

SCALE IN FEET

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	36	108
PROJECT FILE NO. --------			

SIGNING AND PAVEMENT MARKING PLAN

THE MALL AT CHESTNUT HILL

ADD ALTERNATE

THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED REGULATORY, WARNING AND ROUTE MARKER SIGNS AND SUPPORTS, GROUND MOUNTED GUIDE SIGNS AND SUPPORTS, OVERHEAD SIGNS AND SUPPORTS, AND SIGN SUPPORT FOUNDATION DESIGNS. FOR WORK WITHIN THE CITY OF NEWTON ONLY.

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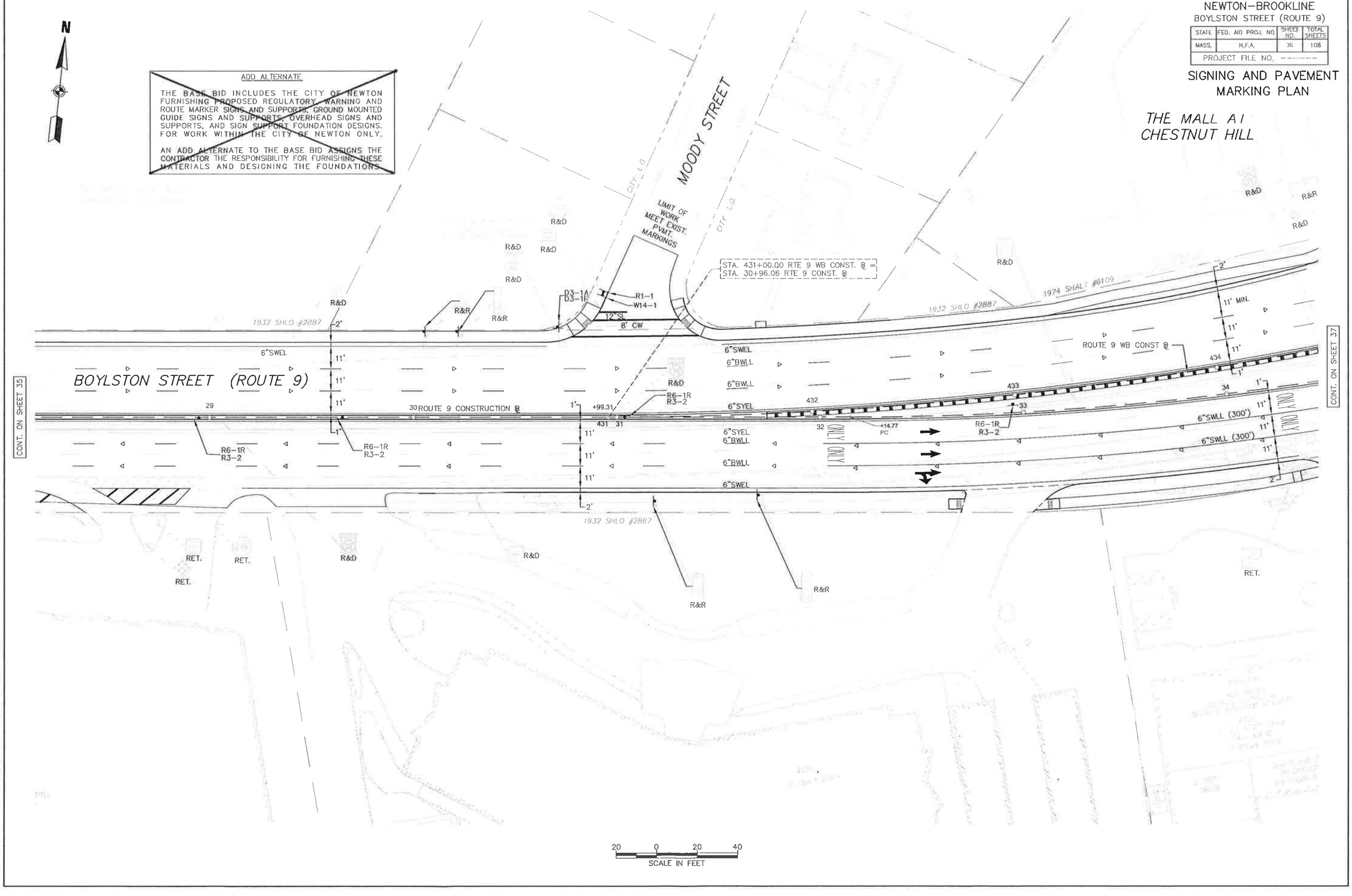

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	37	108
PROJECT FILE NO. -------			

SIGNING AND PAVEMENT MARKING PLAN

~~ADD ALTERNATE~~

~~THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED REGULATORY, WARNING AND ROUTE MARKER SIGNS AND SUPPORTS, GROUND MOUNTED GUIDE SIGNS AND SUPPORTS, OVERHEAD SIGNS AND SUPPORTS, AND SIGN SUPPORT FOUNDATION DESIGNS. FOR WORK WITHIN THE CITY OF NEWTON ONLY.~~

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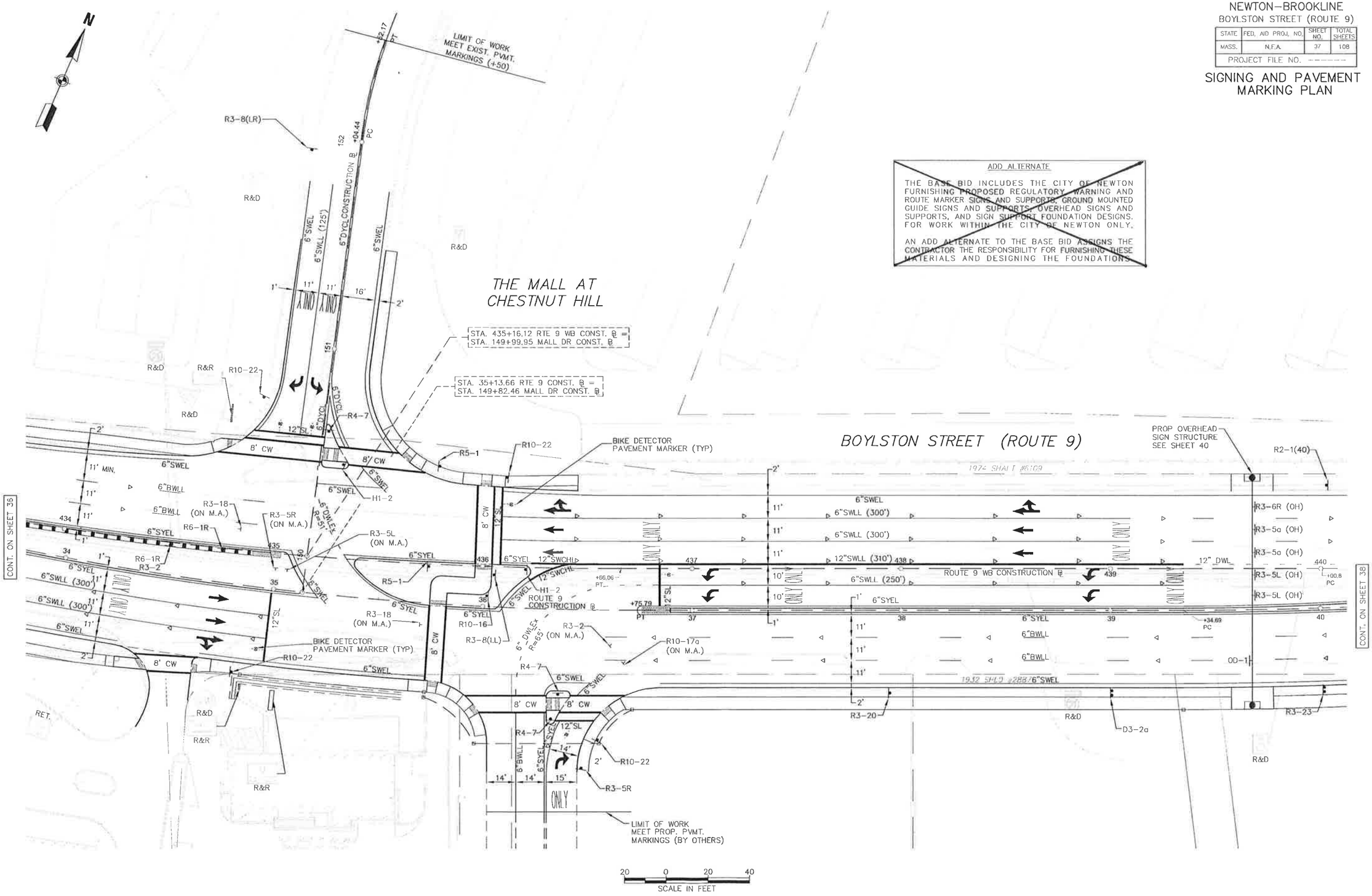
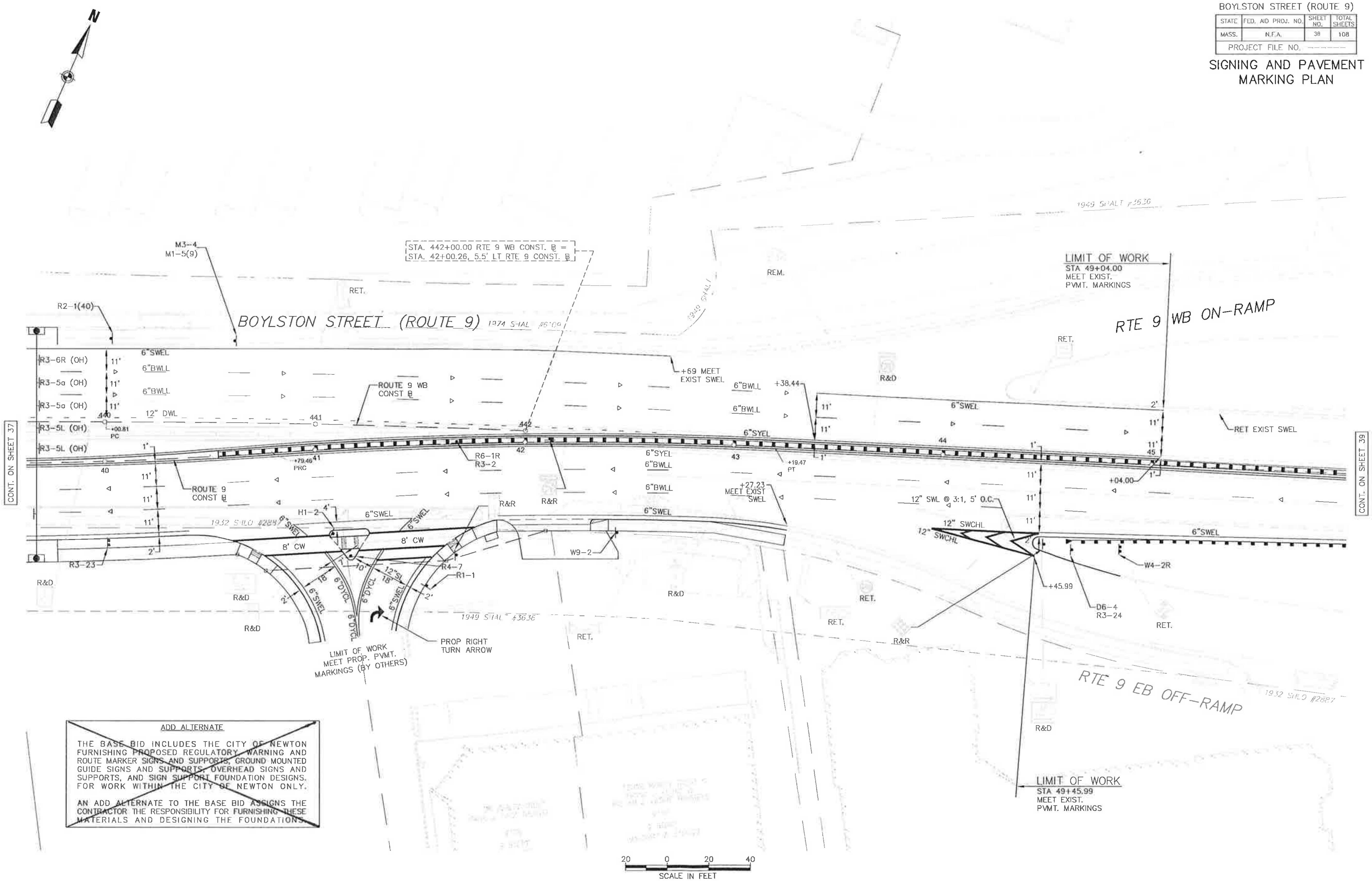


NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	38	108
PROJECT FILE NO. ------			

SIGNING AND PAVEMENT MARKING PLAN



N
BOYLSTON STREET (ROUTE 9)
1974 SHAL #6709
STA. 442+00.00 RTE 9 WB CONST. ℄ =
STA. 42+00.26, 5.5' LT RTE 9 CONST. ℄
M3-4
M1-5(9)
R2-1(40)
RET.
REM.
1949 SHALT #3636
1949 SHALT
LIMIT OF WORK
STA 49+04.00
MEET EXIST.
PVMT. MARKINGS
RTE 9 WB ON-RAMP
RET.
R&D
+69 MEET
EXIST SWEL
+38.44
6"SWEL
6"BWLL
6"SYEL
12" DWL
R3-6R (OH)
R3-5a (OH)
R3-5a (OH)
R3-5L (OH)
R3-5L (OH)
11'
1'
2'
440
+00.81
PC
441
442
42
43
44
45
40
41
+79.46
PRC
ROUTE 9 WB
CONST ℄
ROUTE 9
CONST ℄
R6-1R
R3-2
+19.47
PT
+27.23
MEET EXIST
SWEL
RET EXIST SWEL
+04.00
12" SWL @ 3:1, 5' O.C.
12" SWCHL
12" SWCHL
CONT. ON SHEET 37
CONT. ON SHEET 39
H1-2
4'
8' CW
1932 SHLO #2887
R&R
R&D
W9-2
R4-7
R1-1
10'
12"SL
18'
6"DYCL
6"SWEL
R3-23
PROP RIGHT
TURN ARROW
LIMIT OF WORK
MEET PROP. PVMT.
MARKINGS (BY OTHERS)
1949 SHAL #3636
RET.
R&R
+45.99
W4-2R
D6-4
R3-24
RTE 9 EB OFF-RAMP
1932 SHLO #2887
LIMIT OF WORK
STA 49+45.99
MEET EXIST.
PVMT. MARKINGS
20 0 20 40
SCALE IN FEET

ADD ALTERNATE

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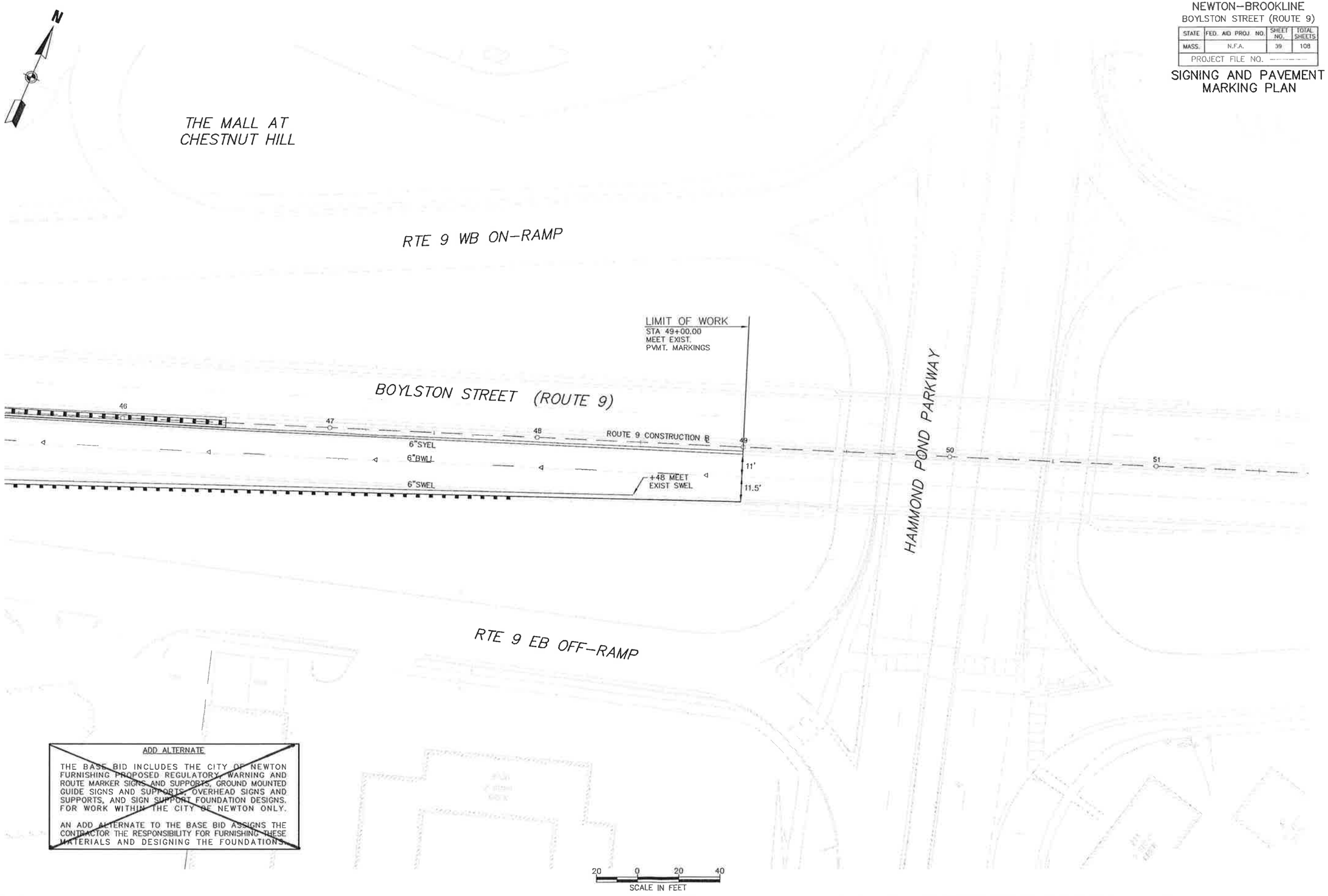
NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	39	108
PROJECT FILE NO. ----------			

SIGNING AND PAVEMENT MARKING PLAN



ADD ALTERNATE

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GENERAL NOTES:

1. HEIGHT OF EXISTING SUPPORTS AND LENGTH OF SPAN CHORDS ARE APPROXIMATE AND TO BE VERIFIED IN THE FIELD.
2. CLEARANCE HEIGHT FROM THE BOTTOM EDGE OF THE NEW PANEL TO THE HIGHEST POINT ON THE ROAD SURFACE SHALL BE AS FOLLOWS:

   a) INSTALLED ON NEW SUPPORT: 17'–6" MINIMUM
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE NEW SIGN STRUCTURES AND FOUNDATIONS, INCLUDING ANY ASSEMBLY OR ATTACHMENT MODIFICATION REQUIRED TO ACCOMMODATE THE NEW PANEL CLEARANCE HEIGHT SPECIFIED ABOVE.
4. ALIGNMENT OF THE PANELS AS SHOWN IN THE CROSS SECTION IS APPROXIMATE. ADJUSTMENT IN THE FIELD AS APPROPRIATE (TO SUIT EXISTING CONDITION OF SUPPORT) SHALL BE APPROVED BY MASSDOT PRIOR TO INSTALLATION OF PANELS.
5. SUPPORTS FOR OVERHEAD GUIDE SIGNS SHALL BE DESIGNED IN ACCORDANCE WITH THE 2001 AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, INCLUDING THE 2003 SUPPLEMENT. ALL OVERHEAD SIGN SUPPORTS SHALL BE DESIGNED TO SUSTAIN A MAXIMUM WIND SPEED OF 110 MPH. ALL CANTILEVER SIGN SUPPORTS SHALL BE DESIGNED TO MEET AASHTO FATIGUE CATEGORY 1 (CRITICAL).
6. SUPPORTS FOR GROUND MOUNTED SIGNS SHALL BE IN ACCORDANCE WITH MASSDOT STANDARDS.
7. THE TOLERANCE VALUES FOR THE "±" NOTATIONS PROVIDED ON THE INDIVIDUAL SUPPORT DETAILS CONTAINED ON THESE PLAN SHEETS SHALL BE AS FOLLOWS:

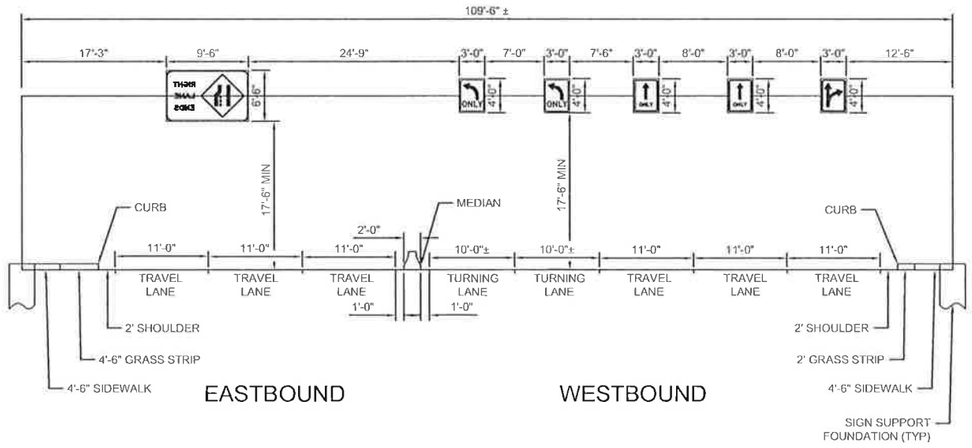
   a) LEFT OR RIGHT OFFSET FROM EDGE OF ROAD TO C/L OF UPRIGHT – 4 FEET
   b) OVERALL SPAN LENGTH – 8 FEET
   c) OFFSET BETWEEN SIGN PANELS – 0.5 FEET
   d) POSITIONING OF POLE AND FOOTING MUST LEAVE 3' FOR ADA CLEARANCE ON SIDEWALK.

PROVISION OF THESE "±" VALUES IS FOR BIDDING PURPOSES ONLY, AND DOES NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITIES UNDER SECTION 840.2 OF THE STANDARD SPECIFICATIONS.

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	40	108
PROJECT FILE NO. ------			

OVERHEAD SIGN ELEVATION



ADD ALTERNATE

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BOYLSTON STREET (RTE. 9) STA 39+67.50
LOOKING DOWNSTATION

HOR. SCALE IN FEET
0 8 20 40

NEWTON–BROOKLINE

BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	41	108
PROJECT FILE NO. ————			

SIGN SUMMARY SHEET

IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES) WIDTH	HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	VERTICAL SPACING	ARROW RTE MKR	NUMBER OF SIGNS REQUIRED	COLOR BACK-GROUND	LEGEND	BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (SF)	AREA IN SQUARE FEET
R1-1	30	30	STOP	SEE 2009 MUTCD			3	SEE 2009 MUTCD			P5-1 (3)	6.25	18.75
R2-1(40)	36	48	SPEED LIMIT 40	SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-2 (1)	12.00	12.00
R2-1(50)	36	48	SPEED LIMIT 50	SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-2 (1)	12.00	12.00
R3-1	36	36		SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT ON MAST ARM (1)	9.00	9.00
R3-2	24	24		SEE 2009 MUTCD			14	SEE 2009 MUTCD			MOUNT WITH R6-1R (13) MOUNT ON MAST ARM (1)	4.00	56.00
R3-5L	30	36	ONLY	SEE 2009 MUTCD			2	SEE 2009 MUTCD			MOUNT ON MAST ARM (2)	7.50	15.00
R3-5L(OH)	36	48	ONLY	SEE 2009 MUTCD			2	SEE 2009 MUTCD			MOUNT ON OVERHEAD STRUCTURE (2)	12.00	24.00
R3-5R	30	36	ONLY	SEE 2009 MUTCD			4	SEE 2009 MUTCD			MOUNT ON MAST ARM (2) P5-1 (2)	7.50	30.00
R3-5a(OH)	36	48	ONLY	SEE 2009 MUTCD			2	SEE 2009 MUTCD			MOUNT ON OVERHEAD STRUCTURE (2)	12.00	24.00
R3-6(LT)	30	36		SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT ON MAST ARM (1)	7.50	7.50
R3-6R(OH)	36	48		SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT ON OVERHEAD STRUCTURE (1)	12.00	12.00
R3-8(LR)	30	30	ONLY ONLY	SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-1 (1)	6.25	6.25
R3-8(LL)	30	30	ONLY ONLY	SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT ON PEDESTAL POLE (1)	6.25	6.25
R3-18	36	36		SEE 2009 MUTCD			6	SEE 2009 MUTCD			MOUNT ON MAST ARM (4) MOUNT WITH R4-7 (2)	9.00	54.00
R3-20	36	48	TO REVERSE DIRECTION KEEP RIGHT	SEE MASSDOT STANDARD			1	SEE MASSDOT STANDARD			P5-1 (1)	12.00	12.00
R3-23	60	36	ALL TURNS FROM RIGHT LANE	SEE 2009 MUTCD			2	SEE 2009 MUTCD			P5-2 (2)	15.00	30.00
R3-24	72	18	ALL TURNS	SEE 2009 MUTCD			2	SEE 2009 MUTCD			MOUNT WITH D6-3 (1) D6-4 (1)	9.00	18.00
R4-7	24	30		SEE 2009 MUTCD			7	SEE 2009 MUTCD			P5-2 (2) P5-1 (5)	5.00	35.00
R5-1	36	36	DO NOT ENTER	SEE 2009 MUTCD			2	SEE 2009 MUTCD			P5-1 (2)	9.00	18.00
R6-1R	36	12	ONE WAY	SEE 2009 MUTCD			14	SEE 2009 MUTCD			P5-1 (14)	3.00	42.00
R6-1R (P,B,S.)	36	12	ONE WAY (P,B,S.)	SEE 2009 MUTCD			2	SEE 2009 MUTCD			P5-1 (2)	3.00	6.00
R6-2R	30	36	ONE WAY	SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-1 (1)	7.50	7.50
R7-1L	12	18	NO PARKING ANY TIME	SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-1 (1)	1.50	1.50
R7-1R	12	18	NO PARKING ANY TIME	SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-1 (1)	1.50	1.50
R10-16	30	36	U-TURN YIELD TO RIGHT TURN	SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT ON PEDESTAL POLE (1)	7.50	7.50
R10-17a	36	48	RIGHT ON RED ARROW AFTER STOP	SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT ON MAST ARM (1)	12.00	12.00
R10-22	18	24	TO REQUEST GREEN WAIT ON	SEE MASSDOT STANDARD			8	SEE MASSDOT STANDARD			MOUNT WITH R6-1R(P,B,S.) (2) P5-1 (6)	3.00	* 24.00

~~TOWN OF BROOKLINE~~

	SIZE OF SIGN (INCHES) WIDTH	HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	VERTICAL SPACING	ARROW RTE MKR	NUMBER OF SIGNS REQUIRED	COLOR BACK-GROUND	LEGEND	BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (SF)	AREA IN SQUARE FEET
R3-5U	36	30	ONLY	SEE 2009 MUTCD			2	SEE 2009 MUTCD			P5-1 (2)	7.50	15.00
R10-15	30	36	TURNING VEHICLES YIELD TO	SEE 2009 MUTCD			4	SEE 2009 MUTCD			MOUNT ON PEDESTAL POLE (2) MOUNT ON MAST ARM (2)	7.50	30.00
W25-1	24	30	ONCOMING TRAFFIC HAS EXTENDED GREEN	SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT ON MAST ARM (1)	5.00	5.00

SUB-TOTAL(1) AREA OF SIGNS: 551.75 SF

~~ADD ALTERNATE~~

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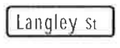
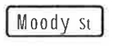
IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES) WIDTH	HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	VERTICAL SPACING	ARROW RTE MKR	NUMBER OF SIGNS REQUIRED	COLOR BACKGROUND	LEGEND	BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (SF)	AREA IN SQUARE FEET
W4-2R	48	48		SEE 2009 MUTCD			2	SEE 2009 MUTCD			P5-2 (2)	16.00	32.00
W9-2	36	36		SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-1 (1)	9.00	9.00
W14-1	30	30		SEE 2009 MUTCD			2	SEE 2009 MUTCD			P5-1 (2)	6.25	12.50
D3-2a	60	36		SEE 2009 MUTCD			1	SEE 2009 MUTCD			P5-2 (1)	15.00	15.00
H1-2	24	24		SEE MASSDOT STANDARD			4	SEE MASSDOT STANDARD			PER EACH	PER EACH	PER EACH
M1-5(9)	36	36		SEE MASSDOT STANDARD			1	SEE MASSDOT STANDARD			P5-2 (1)	9.00	9.00
M3-4	36	18		SEE 2009 MUTCD			1	SEE 2009 MUTCD			MOUNT WITH M1-5(9) (1)	6.00	6.00

SUB-TOTAL(2) AREA OF SIGNS: 83.5 SF

TOTAL AREA OF SIGNS = SUB-TOTAL(1) + SUB-TOTAL(2)

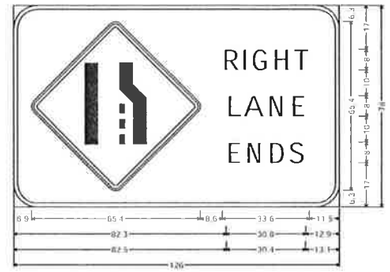
TOTAL AREA OF SIGNS = 551.75 + 83.5

TOTAL AREA OF SIGNS = 635.25 SF

IDENTIFICATION NUMBER	SIZE OF SIGN (INCHES) WIDTH	HEIGHT	TEXT	TEXT DIMENSIONS (INCHES) LETTER HEIGHT	VERTICAL SPACING	ARROW RTE MKR	NUMBER OF SIGNS REQUIRED	COLOR BACKGROUND	LEGEND	BORDER	POST SIZE AND NUMBER REQUIRED	UNIT AREA (SF)	AREA IN SQUARE FEET
D3-1A	VARIES	16		8"/6"	SEE NOTE 1		5	SEE NOTE 1			MOUNT ON MAST ARM (1) P5-1 (4)	PER EACH	PER EACH
D3-1B	VARIES	16		8"/6"	SEE NOTE 1		2	SEE NOTE 1			MOUNT WITH D3-1A (1) P5-1 (1)	PER EACH	PER EACH
D3-1C	VARIES	16		8"/6"	SEE NOTE 1		2	SEE NOTE 1			MOUNT WITH D3-1A (1) D3-1B (1)	PER EACH	PER EACH
D3-1D	VARIES	16		8"/6"	SEE NOTE 1		1	SEE NOTE 1			MOUNT WITH D3-1A (1)	PER EACH	PER EACH
D3-1E	VARIES	16		8"/6"	SEE NOTE 1		1	SEE NOTE 1			MOUNT WITH D3-1A (1)	PER EACH	PER EACH
D3-1F	VARIES	16		8"/6"	SEE NOTE 1		1	SEE NOTE 1			MOUNT WITH D3-1A (1)	PER EACH	PER EACH

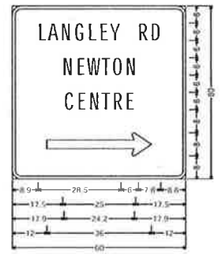
NOTES:
1. ALL D3-1 (STREET NAME) SIGNS SHALL FOLLOW 2009 MUTCD STANDARDS FOR TEXT DIMENSIONS AND CITY OF NEWTON STREET NAME SIGN STANDARDS FOR LAYOUT.
2. ALL D SIGNS SHALL BE FABRICATED WITH EITHER HIGH INTENSITY (ASTM TYPE III OR IV) OR PRISMATIC ENCLOSED LENS REFLECTIVE SHEETING MEETING OR EXCEEDING THE REQUIREMENTS OF (ASTM TYPE VII, VIII, IX, OR X).
3. ALL SUPPORTS SHALL BE BREAKAWAY TYPE CONFORMING TO NCHRP CRITERIA 350. FOR D6/D8 ASSEMBLY A STANDARD 5-INCH TUBULAR ROUND STEEL POST SHALL BE USED.

OD-1		
10.5'	6.5'	68.25 SF
SIGNS REQUIRED		1
TOTAL AREA		68.25 SF
BACKGROUND	LEGEND	BORDER
YELLOW	BLACK	BLACK

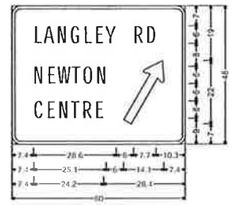


D6-1		
5.0'	5.0'	25.00 SF
SIGNS REQUIRED		1
TOTAL AREA		25.00 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	SILVER WHITE	SILVER WHITE

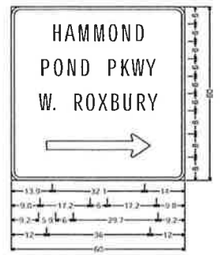
D6-2		
5.0'	5.0'	25.00 SF
SIGNS REQUIRED		1
TOTAL AREA		25.00 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	SILVER WHITE	SILVER WHITE



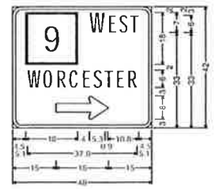
D6-3		
5.0'	4.0'	20.00 SF
SIGNS REQUIRED		1
TOTAL AREA		20.00 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	SILVER WHITE	SILVER WHITE



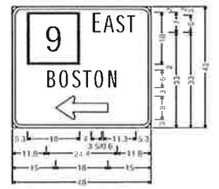
D6-4		
5.0'	5.0'	25.00 SF
SIGNS REQUIRED		1
TOTAL AREA		25.00 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	SILVER WHITE	SILVER WHITE



D8-1		
4.0'	3.5'	14.00 SF
SIGNS REQUIRED		1
TOTAL AREA		14.00 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	SILVER WHITE	SILVER WHITE



D8-2		
4.0'	3.5'	14.00 SF
SIGNS REQUIRED		1
TOTAL AREA		14.00 SF
BACKGROUND	LEGEND	BORDER
GREEN REFL.	SILVER WHITE	SILVER WHITE



ADD ALTERNATE

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NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	42	108
PROJECT FILE NO. -------			

SIGN SUMMARY SHEET

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	43	108
PROJECT FILE NO. ————			

TRAFFIC SIGNAL PLAN
LOCATION C1
RTE 9 AT LANGLEY RD

N

JACKSON STREET
CITY L.O.
LANGLEY ROAD
BECK LANE
JACKSON STREET
ONE-WAY
CITY L.O.
BOYLSTON STREET (ROUTE 9)
1932 SH.L.O #2887
CONSTRUCTION B
ONE-WAY
ONE-WAY
ONE-WAY
ONE-WAY
ONE-WAY

PROP. VIDEO DETECTION ZONE (TYP.)
PROP. 40 FT. MAST ARM W/FND.
PROP. 12"x24" PULLBOX
PROP. PREEMPTION RECEIVER (TYP.)
PROP. 3" SCH. 80 PVC CONDUIT (TYP.)
PROP. 8 FT. PEDESTAL POLE W/FND. (TYP.)
PROP. VEHICLE QUEUE DETECTION
PROP. 20 FT. PEDESTAL POLE W/FND.
PROP. PREEMPTION CONFIRMATION STROBE
PROP. SPREAD SPECTRUM ANTENNA
PROP. ELEC. SERVICE CONNECTION
PROP. 8ø TS2–TYPE 1 T.S. CONTROLLER W/CABINET, SPREAD SPECTRUM RADIO COMMUNICATION & FND.
PROP. 35 FT. MAST ARM W/FND.
PROP. 35 FT. MAST ARM W/FND.
PROP. 12"x12" PULLBOX (TYP.)
PROP. 10 FT. PEDESTAL POLE W/FND.
PROP. VIDEO DETECTION CAMERA (TYP.)

20 0 20 40
SCALE IN FEET

ADD ALTERNATE

THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED TRAFFIC SIGNAL EQUIPMENT LISTED ON THE MAJOR ITEMS LISTS (WITH THE EXCEPTION OF THE ELECTRIC SERVICE CONNECTION, MAST ARM FOUNDATIONS, AND THE FOUNDATION AND CONCRETE PAD FOR THE TRAFFIC SIGNAL CONTROLLER CABINET) AND REGULATORY SIGNS AND SUPPORTS FOR LOCATIONS C1 & C2.

AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS.

SEQUENCE AND TIMING CHART

ROUTE 9 (LANGLEY RD / PRIVATE DRIVE)

ROUTE 9 AT LANGLEY ROAD

NEWTON, MA

	WB	SB	EB				PED	
	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7	PHASE 8	PHASE 9	EMERGENCY FLASH OPERATION
	NOT USED	*		NOT USED	NOT USED	*	NOT USED	NOT USED	*	

SEQUENCE AND TIMING

APPROACH	DIRECTION	FACE	ø/ø	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	
ROUTE 9	EB	A,B	6				R	R	R	R	R	R							G	Y	R							R	R	R	FY
ROUTE 9	EB	C,D	6				R	R	R	R	R	R							G	Y	R							R	R	R	FY
ROUTE 9	WB	**E,F,G,H**	2				G	Y	R	R	R	R							R	R	R							R	R	R	FY
LANGLEY ROAD	SB	**J**	3				~~<R~~	~~<R-~~	~~<R-~~	~~<G-~~	~~<Y-~~	~~<R-~~							~~<R-~~	~~<R-~~	~~<R-~~							~~<R-~~	~~<R-~~	~~<R-~~	**FRA**
LANGLEY ROAD	SB	K	3				R	R	R	G	Y	R							R	R	R							R	R	R	FR
LANGLEY ROAD	SB	L	3				R	R	R	G	Y	R							R	R	R							R	R	R	FR
PEDESTRIAN	E-W	**P1-P2**	2				W	FDW	**DW**	DW	**DW**	**DW**							**DW**	DW	**DW**							**DW**	**DW**	DW	OUT
PEDESTRIAN	N-S	P3-P4	9				DW	DW	DW	**DW**	DW	DW							DW	DW	DW							W	FDW	DW	OUT
PEDESTRIAN	E-W	P5-P6	6				DW	DW	DW	DW	DW	DW							W	FDW	DW							DW	DW	DW	OUT

TIMING IN SECONDS

MINIMUM GREEN				20			8									**20**											
VEHICLE **INTERVAL**				2			2									2											
MAXIMUM GREEN I (FREE OPERATION)				60			30									60											
MAXIMUM GREEN II (DURING COORDINATION)				55			23									55											
YELLOW CLEAR					4			**3**									4										
ALL RED CLEAR						3			3									3									4
WALK INTERVAL				7												7									7		
PED. CLEARANCE					7												5									16	
DETECTOR				NON-LOCK			NON-LOCK									NON-LOCK									LOCK		
RECALL				SOFT			OFF									SOFT									OFF		

COORDINATION DATA

TIMING PLAN	CYCLE LENGTH	REF/OFFSET
WKDY MORNING (6:30AM-9:30AM)	110	EOG/0
WKDY EVENING (3PM-7PM)	110	EOG/0
SATURDAY (11AM-6PM)	110	EOG/0

PHASE TIMING (WITH PEDESTRIAN ACTUATION)

	SEC.	SEC.	SEC.	SEC.	SEC.	SEC.	SEC.	SEC.	SEC.
WKDY MORNING (6:30AM-9:30AM)		62	21			62			27
WKDY EVENING (3PM-7PM)		61	22			61			27
SATURDAY (11AM-6PM)		**54**	**29**			**54**			**27**

NOTES:
1. FLASHING OPERATION PER M.U.T.C.D.
2. MAXIMUM GREEN II FOR COORDINATION.
3. PHASE 2 AND PHASE 6 ARE DUAL ENTRY.

* UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY.

ITEM 816.01-A
TRAFFIC SIGNAL RECONSTRUCTION
LIST OF MAJOR ITEMS

QUANTITY	DESCRIPTION
1	T.S. CABINET & CONTROLLER 8 PHASE TS2-TYPE 1 W/VIDEO DETECTION, OPTICOM PREEMPTION, CLOSED LOOP SYSTEM (SPREAD SPECTRUM RADIO COMMUNICATION SYSTEM), GRAPHICS, FULL INPUT & OUTPUT SUPPRESSION PACKAGE, FOUNDATION & CONCRETE PAD
1	OVERHEAD ELECTRIC SERVICE CONNECTION
2	35 FT TYPE II GALV. STEEL MAST ARM W/FOUNDATION
1	40 FT TYPE II GALV. STEEL MAST ARM W/FOUNDATION
3	8 FT. PEDESTAL POLE, STEEL W/FOUNDATION
1	SPREAD SPECTRUM ANTENNA AND CABLE
1	10 FT. PEDESTAL POLE, STEEL W/ FOUNDATION
1	20 FT. PEDESTAL POLE, STEEL W/ FOUNDATION
10	SIGNAL HEAD 1-WAY 3-SECTION 12" L.E.D. W/LOUVERED BACKPLATE
1	SIGNAL HEAD 1-WAY 4-SECTION 12" L.E.D. W/LOUVERED BACKPLATE
6	PEDESTRIAN SIGNAL HEAD (L.E.D.) W/COUNTDOWN TIMER & CAP VISOR
6	ACCESSIBLE PEDESTRIAN PUSHBUTTON & SIGN W/AUDIBLE & VISIBLE INDICATOR, VIBRO-TACTILE ARROW AND SPEECH-WALK MESSAGE
6	VIDEO DETECTION CAMERA WITH INTERFACE MODULE AND RACK
2	2 CHANNEL PHASE SELECTOR AND RACK (700 SERIES)
3	OPTICOM DETECTOR MODEL 711
1	PREEMPTION CONFIRMATION STROBE (CLEAR)

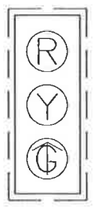
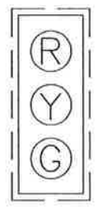
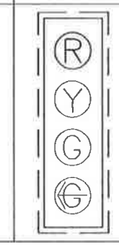
PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL SYSTEM.

~~ADD ALTERNATE~~

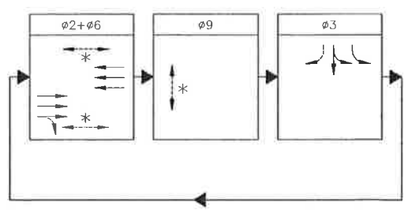
~~THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED TRAFFIC SIGNAL EQUIPMENT LISTED ON THE MAJOR ITEMS LISTS (WITH THE EXCEPTION OF THE ELECTRIC SERVICE CONNECTION, MAST ARM FOUNDATIONS, AND THE FOUNDATION AND CONCRETE PAD FOR THE TRAFFIC SIGNAL CONTROLLER CABINET) AND REGULATORY SIGNS AND SUPPORTS FOR LOCATIONS C1 & C2.~~

~~AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS.~~

PROPOSED SIGNAL HEAD DATA

A,B,E,F,G,H	C,D,L	J	K	P1-P6
				
12" L.E.D. W/5" LOUVERED BACKPLATE				16"x18" HOUSING W/L.E.D. SIGNAL INDICATIONS & TIMER

PREFERENTIAL PHASE SEQUENCE



ANY PHASE OR PHASE COMBINATION NOT CALLED SHALL BE SKIPPED
*UPON PEDESTRIAN PUSHBUTTON ACTUATION

PLAN NOTE: VEHICLE TURNING MOVEMENTS NOT SUPPORTED BY ARROW INDICATIONS, SHOWN AS DASHED ARROWS ON PLAN.

RECEIVER/ PREEMPT 1	RECEIVER/ PREEMPT 2	RECEIVER/ PREEMPT 3
		
ø6	ø2	ø3

NEWTON-BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	44	108
PROJECT FILE NO. -------			

TRAFFIC SIGNAL DATA
LOCATION C1
RTE 9 AT LANGLEY RD

EMERGENCY VEHICLE PREEMPTION OPERATION:

1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT THE INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH.
2. PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR, THE CONTROLLER SHALL TIME THE CLEARANCE INTERVALS OF THE ACTIVE PHASE (IF DIFFERENT THAN THAT TO BE SERVICED) AND ADVANCE TO AND/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED). OTHERWISE, RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
4. NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.
5. MINIMUM GREEN FOR PREEMPTION SEQUENCES SHALL BE 10 SECONDS.

CONSTRUCTION NOTES:

1. CONTROLLER PROGRAMMING SHALL BE ACCOMPLISHED BY QUALIFIED FACTORY REPRESENTATIVES.
2. MAST ARM MOUNTED SIGNS SHALL BE INSTALLED ON ASTRO BRACS.

COORDINATION DATA NOTES:

1. COORDINATION REFERENCE POINT SHALL BE AT THE START OF THE MAIN LINE YELLOW, PHASE 2 AND PHASE 6 (THROUGH MOVEMENT) WITH MAX II GREEN FOR SUB-SYSTEM 1 COORDINATION.
2. DURING COORDINATION, MAIN LINE GREEN TO BE CALLED NOT ACTUATED.
3. SUB-SYSTEM 1 COORDINATION (LOCATIONS C1 & C2) IS BASED ON TIME OF DAY OPERATION AS SHOWN IN THE SEQUENCE AND TIMING CHART AND USES MAX II GREEN FOR SYSTEM COORDINATION AND MAX I GREEN FOR FREE OPERATION, FULLY-ACTUATED MODE.

DETECTOR DATA

ZONE NUMBER	APPROACH	CAMERA	PHASE	DELAY	DIRECTION
1	ROUTE 9	V1	6	0	EB
2	ROUTE 9	V1	6	0	EB
3	BICYCLE ROUTE 9	V1	6	0	EB
4	ROUTE 9	V1	6	0	EB
5	ROUTE 9	V1	6	0	EB
6	ROUTE 9	V1	6	0	EB
7	ROUTE 9	V5	6	0	EB
8	ROUTE 9	V5	6	0	EB
9	ROUTE 9	V5	6	0	EB
10	ROUTE 9	V2	2	0	WB
11	ROUTE 9	V2	2	0	WB
12	BICYCLE ROUTE 9	V2	2	0	WB
13	ROUTE 9	V2	2	0	WB

DETECTOR DATA

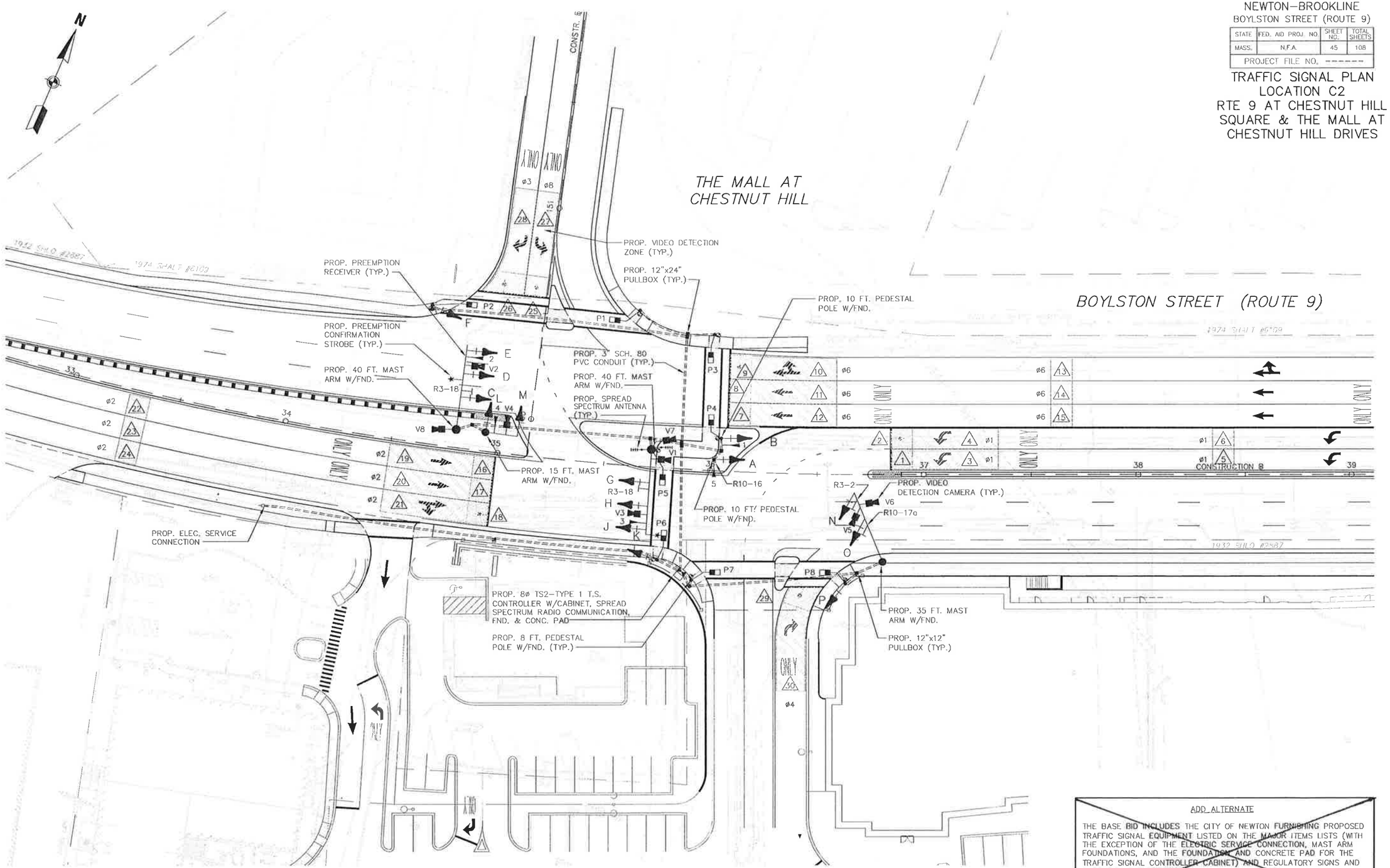
ZONE NUMBER	APPROACH	CAMERA	PHASE	DELAY	DIRECTION
14	ROUTE 9	V2	2	0	WB
15	ROUTE 9	V2	2	0	WB
16	ROUTE 9	V6	2	0	WB
17	ROUTE 9	V6	2	0	WB
18	ROUTE 9	V6	2	0	WB
19	LANGLEY RD	V3	3	0	SB
20	BICYCLE LANGLEY RD	V3	3	0	SB
21	BICYCLE LANGLEY RD	V3	3	0	SB
22	LANGLEY RD	V3	3	0	SB
23	LANGLEY RD	V3	3	0	SB
24	LANGLEY RD	V3	3	0	SB
25	QUEUE JACKSON ST	V4	3	5	WB

NOTE: ALL DETECTORS SHALL CALL AND EXTEND PHASE(S) SHOWN.

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	45	108
PROJECT FILE NO. -------			

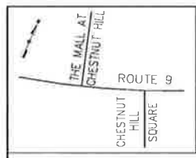
TRAFFIC SIGNAL PLAN
LOCATION C2
RTE 9 AT CHESTNUT HILL SQUARE & THE MALL AT CHESTNUT HILL DRIVES



ADD ALTERNATE

THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED TRAFFIC SIGNAL EQUIPMENT LISTED ON THE MAJOR ITEMS LISTS (WITH THE EXCEPTION OF THE ELECTRIC SERVICE CONNECTION, MAST ARM FOUNDATIONS, AND THE FOUNDATION AND CONCRETE PAD FOR THE TRAFFIC SIGNAL CONTROLLER CABINET) AND REGULATORY SIGNS AND SUPPORTS FOR LOCATIONS C1 & C2.

AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS.



ROUTE 9
AT
CHESTNUT HILL SQUARE &
THE MALL AT CHESTNUT HILL

NEWTON, MA

SEQUENCE AND TIMING CHART

	WBLT	EB	SBRT	NBRT		WB		SBLT	
	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 6	PHASE 7	PHASE 8	EMERGENCY FLASH OPERATION
	*	*			NOT USED	*	NOT USED	*	

SEQUENCE AND TIMING

APPROACH	DIRECTION	FACE	ø/ø	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	R/W	CL1	CL2	
ROUTE 9	WBLT	A,B	1	⟨G⟩	⟨Y⟩	⟨R⟩	⟨R⟩	⟨R⟩	⟨R⟩	⟨R⟩	⟨R⟩	⟨R⟩	⟨R⟩	⟨R⟩	⟨R⟩				⟨R⟩	⟨R⟩	⟨R⟩				FRA
ROUTE 9	WB	C,D	6	R	R	R	R	R	R	R	R	R	R	R	R				G	Y	R				FY
ROUTE 9	WB	E,F	**6**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**				G	Y	R				FY
ROUTE 9	EB	G,H	2	R	R	R	G	Y	R	R	R	R	R	R	R				R	**R**	**R**				**FY**
ROUTE 9	EB	J,K	2	R	R	R	G	Y	R	R	R	R	R	R	R				R	R	R				FY
THE MALL AT CHESTNUT HILL DR.	SB	L	3	R	R	R	R	R	R	G	Y	R	R	R	R				R	R	R				FR
THE MALL AT CHESTNUT HILL DR.	**SB**	M	8	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	**R**	R	R	R				R	R	R	KG/G	Y	R	FR
CHESTNUT HILL SQUARE DR.	NBRT	N,O,P	4	-R>	-R>	-R>	-R>	-R>	-R>	-R>	-R>	-R>	-G>	-Y>	-R>				-R>	-R>	-R>	-R>	-R>	-R>	**FRA**
PEDESTRIAN	E-W	P1-P2	6	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW				W	FDW	DW				OUT
PEDESTRIAN	N-**S**	**P3**-P4	**8**	**DW**	DW	DW	**DW**	DW	DW	**DW**	**DW**	DW	DW	DW	DW				DW	DW	DW				OUT
PEDESTRIAN	N-S	P5-P6	**1**	W	FDW	DW	DW	DW	DW	DW	**DW**	DW	DW	DW	DW				DW	DW	DW				**OUT**
PEDESTRIAN	E-W	P7-P8	2	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW				DW	DW	DW				OUT

TIMING IN SECONDS

MINIMUM GREEN			8			20			8			8						20					8		
VEHICLE INTERVAL			2			2			2			2						2					2		
MAXIMUM GREEN I (FREE **OPERATION**)			35			65			25			35						65					25		
MAXIMUM GREE**N II**			19			**56**			**18**			19						**56**					14		
YELLOW CLEAR				4			4			3			4						4					3	
ALL RED CLEAR					3			3			1			3						3					5
WALK INTERVAL			7			7												7					7		
PED. CLEARANCE				7			**15**												20					7	
DETECTOR			NON-LOCK			NON-LOCK			NON-LOCK			NON-LOCK						NON-LOCK					NON-LOCK		
RECALL			OFF			SOFT			OFF			OFF						SOFT					OFF		

COORDINATION DATA			PHASE TIMING																					
TIMING PLAN	CYCLE LENGTH	REF/OFFSET	SEC.			SEC.			SEC.			SEC.			SEC.			SEC.			SEC.			
WKDY MORNING (6:30AM-9:30AM)	110	**EOG**/17	26			63			21			26						63					21		
WKDY EVENING (3PM-7PM)	11**0**	**EOG/10**	**26**			**62**			22			**26**						62					22		
SATURDAY (11AM-6PM)	110	EOG/17	26			63			21			26						63					21		

NOTES: 1. FLASHING OPERATION PER M.U.T.C.D.
2. MAXIMUM GREEN II FOR COORDINATION.
3. PHASE 2 AND PHASE 6 ARE DUAL ENTRY.
4. PHASE 1 AND PHASE 4 ARE DUAL ENTRY.
* UPON PEDESTRIAN PUSHBUTTON ACTUATION ONLY.

ITEM 815.1-**A**
TRAFFIC SIGNAL CONSTRUCTION
LIST OF MAJOR ITEMS

QUANTITY	DESCRIPTION
1	T.S. CABINET & CONTROLLER 8 PHASE TS2-TYPE 1 W/VIDEO DETECTION, OPTICOM PREEMPTION, CLOSED LOOP SYSTEM (SPREAD SPECTRUM RADIO COMMUNICATION SYSTEM), GRAPHICS, FULL INPUT & OUTPUT SUPPRESSION PACKAGE, FOUNDATION & CONCRETE PAD
1	OVERHEAD ELECTRIC SERVICE CONNECTION
1	15 FT. TYPE II GALV. STEEL MAST ARM W/FOUNDATION
1	35 FT. TYPE II GALV. STEEL MAST ARM W/FOUNDATION
2	40 FT. TYPE II GALV. STEEL MAST ARM W/FOUNDATION
3	8 FT. PEDESTAL POLE, STEEL W/FOUNDATION
5	10 FT. PEDESTAL POLE, STEEL W/FOUNDATION
14	SIGNAL HEAD 1-WAY 3-SECTION 12" L.E.D. W/LOUVERED BACKPLATE (4 HEADS W/LOUVERS)
1	SIGNAL HEAD 1-WAY 4-SECTION 12" L.E.D. W/LOUVERED BACKPLATE
8	PEDESTRIAN SIGNAL HEAD (L.E.D.) W/COUNTDOWN TIMER & CAP VISOR
8	ACCESSIBLE PEDESTRIAN PUSHBUTTON & SIGN W/AUDIBLE & VISIBLE INDICATOR, VIBRO-TACTILE ARROW AND SPEECH-WALK MESSAGE
8	VIDEO DETECTION CAMERA WITH INTERFACE MODULE AND CABLE
3	2 CHANNEL PHASE SELECTOR AND RACK (700 SERIES)
5	OPTICOM DETECTOR MODEL 711
2	PREEMPTION CONFIRMATION STROBE (CLEAR)
2	SPREAD SPECTRUM ANTENNA WITH CABLE

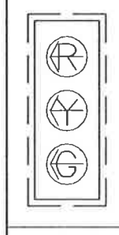
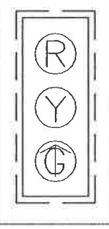
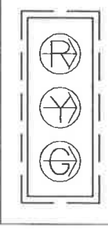
PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL SYSTEM.

ADD ALTERNATE

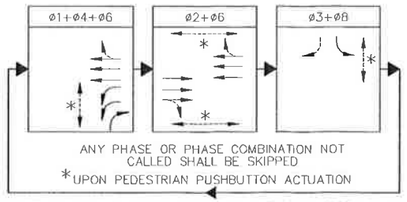
THE BASE BID INCLUDES THE CITY OF NEWTON FURNISHING PROPOSED TRAFFIC SIGNAL EQUIPMENT LISTED ON THE MAJOR ITEMS LISTS (WITH THE EXCEPTION OF THE ELECTRIC SERVICE CONNECTION, MAST ARM FOUNDATIONS, AND THE FOUNDATION AND CONCRETE PAD FOR THE TRAFFIC SIGNAL CONTROLLER CABINET) AND REGULATORY SIGNS AND SUPPORTS FOR LOCATIONS C1 & C2.

AN ADD ALTERNATE TO THE BASE BID ASSIGNS THE CONTRACTOR THE RESPONSIBILITY FOR FURNISHING THESE MATERIALS.

PROPOSED SIGNAL HEAD DATA

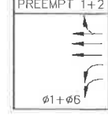
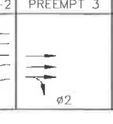
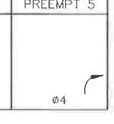
A,B	C,D,G,H	E,F,J,K,L	M	N,O,P	P1-P8
					
12" L.E.D. W/5" LOUVERED BACKPLATE (G, H, J & K W/LOUVERS)					16"x18" HOUSING W/L.E.D. SIGNAL INDICATIONS & TIMER

PREFERENTIAL PHASE SEQUENCE



ANY PHASE OR PHASE COMBINATION NOT CALLED SHALL BE SKIPPED
*UPON PEDESTRIAN PUSHBUTTON ACTUATION

PLAN NOTE: VEHICLE TURNING MOVEMENTS NOT SUPPORTED BY ARROW INDICATIONS, SHOWN AS DASHED ARROWS ON PLAN.

RECEIVER/ PREEMPT 1+2	RECEIVER/ PREEMPT 3	RECEIVER/ PREEMPT 4	RECEIVER/ PREEMPT 5
			
ø1+ø6	ø2	ø3+ø8	ø4

EMERGENCY VEHICLE PREEMPTION OPERATION:

1. EMERGENCY VEHICLE PREEMPTION SHALL BE ACTUATED BY AN OPTICAL SIGNAL FROM AN OPTICAL EMITTER MOUNTED ON AN EMERGENCY VEHICLE AND RECEIVED BY AN OPTICAL DETECTOR LOCATED AT THE INTERSECTION. A SEPARATE RECEIVING DETECTOR IS REQUIRED FOR EACH DETECTED APPROACH.
2. PREEMPTION SIGNALS FROM MULTIPLE APPROACHES SHALL BE SERVICED ON A FIRST DETECTED FIRST SERVED BASIS.
3. IN RESPONSE TO A PREEMPTION SIGNAL RECEIVED AT AN INTERSECTION BY OPTICAL DETECTOR, THE CONTROLLER SHALL TIME THE CLEARANCE INTERVALS OF THE ACTIVE PHASE (IF DIFFERENT THAN THAT TO BE SERVICED) AND ADVANCE TO AND/OR HOLD IN EMERGENCY VEHICLE PREEMPTION PHASE UNTIL PREEMPTION SIGNAL CEASES. THE CONTROLLER SHALL THEN TIME CLEARANCES AND SIMILARLY SERVICE OTHER EMERGENCY VEHICLE PREEMPTION SEQUENCES IN THE ORDER RECEIVED (IF RECEIVED). OTHERWISE, RESUME NORMAL PREFERENTIAL PHASE SEQUENCE.
4. NORMAL CLEARANCES SHALL BE PROVIDED ON PHASES THAT ARE TO BE TERMINATED BY PREEMPTION DEMAND.
5. MINIMUM GREEN FOR PREEMPTION SEQUENCES SHALL BE 10 SECONDS.

CONSTRUCTION NOTES:

1. CONTROLLER PROGRAMMING SHALL BE ACCOMPLISHED BY QUALIFIED FACTORY REPRESENTATIVES.
2. MAST ARM MOUNTED SIGNS SHALL BE INSTALLED ON ASTRO BRACS.

COORDINATION DATA NOTES:

1. COORDINATION REFERENCE POINT SHALL BE AT THE START OF THE MAIN LINE YELLOW, PHASE 2 AND PHASE 6 (THROUGH MOVEMENT) WITH MAX II GREEN FOR SUB-SYSTEM 1 COORDINATION.
2. DURING COORDINATION, MAIN LINE GREEN TO BE CALLED NOT ACTUATED.
3. SUB-SYSTEM 1 COORDINATION (LOCATIONS C1 & C2) IS BASED ON TIME OF DAY OPERATION AS SHOWN IN THE SEQUENCE AND TIMING CHART AND USES MAX II GREEN FOR SYSTEM COORDINATION AND MAX I GREEN FOR FREE OPERATION, FULLY-ACTUATED MODE.

DETECTOR DATA

ZONE NUMBER	APPROACH	CAMERA	PHASE	DIRECTION
1	ROUTE 9	V1	1	WBLT
2	BICYCLE ROUTE 9	V1	1	WBLT
3	ROUTE 9	V1	1	WBLT
4	ROUTE 9	V1	1	WBLT
5	ROUTE 9	V6	1	WBLT
6	ROUTE 9	V6	1	WBLT
7	ROUTE 9	V2	6	WB
8	ROUTE 9	V2	6	WB
9	BICYCLE ROUTE 9	V2	6	WB
10	ROUTE 9	V2	6	WB
11	ROUTE 9	V2	6	WB
12	ROUTE 9	V2	6	WB
13	ROUTE 9	V7	6	WB
14	ROUTE 9	V7	6	WB
15	ROUTE 9	V7	6	WB

DETECTOR DATA

ZONE NUMBER	APPROACH	CAMERA	PHASE	DIRECTION
16	ROUTE 9	V3	2	EB
17	ROUTE 9	V3	2	EB
18	BICYCLE ROUTE 9	V3	2	EB
19	ROUTE 9	V3	2	EB
20	ROUTE 9	V3	2	EB
21	ROUTE 9	V3	2	EB
22	ROUTE 9	V8	2	EB
23	ROUTE 9	V8	2	EB
24	ROUTE 9	V8	2	EB
25	BICYCLE THE MALL AT CHESTNUT HILL DRIVE	V4	8	SBLT
26	BICYCLE THE MALL AT CHESTNUT HILL DRIVE	V4	3	SBRT
27	THE MALL AT CHESTNUT HILL DRIVE	V4	8	SBLT
28	THE MALL AT CHESTNUT HILL DRIVE	V4	3	SBRT
29	BICYCLE CHESTNUT HILL SQUARE DRIVE	V5	4	NBRT
30	CHESTNUT HILL SQUARE DRIVE	V5	4	NBRT

NOTE: ALL DETECTORS SHALL CALL AND EXTEND PHASE(S) SHOWN.

NEWTON-BROOKLINE
BOYLSTON STREET (ROUTE 9)

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	46	108
PROJECT FILE NO. -------			

TRAFFIC SIGNAL DATA
LOCATION C2
RTE 9 AT CHESTNUT HILL SQUARE & THE MALL AT CHESTNUT HILL DRIVES

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

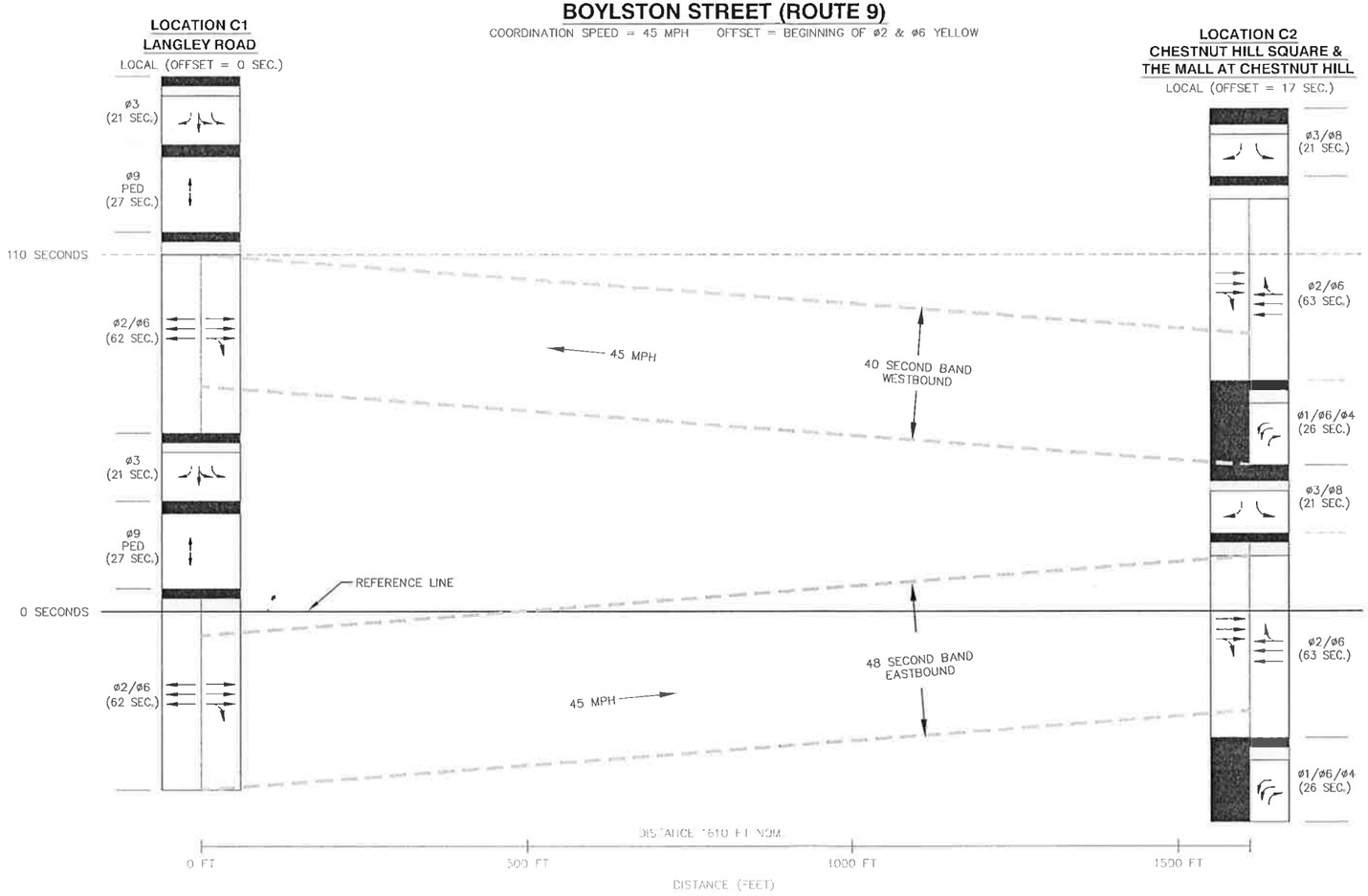
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	50	108
PROJECT FILE NO. -------			

TIME SPACE DIAGRAMS
SYSTEM 1
TIMING PLAN 1
WEEKDAY AM

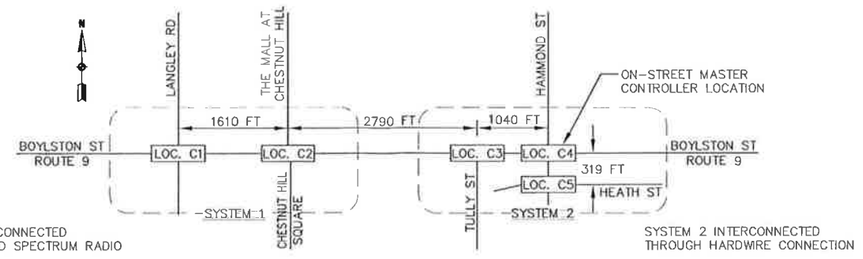
SYSTEM 1 - TIMING PLAN 1
WEEKDAY AM PEAK PERIOD (6:30 AM - 9:30 AM)

BOYLSTON STREET (ROUTE 9)

COORDINATION SPEED = 45 MPH OFFSET = BEGINNING OF ø2 & ø6 YELLOW



CYCLE LENGTH	=	110 SECONDS
BOYLSTON STREET (ROUTE 9):		
EB BANDWIDTH	=	48 SECONDS
WB BANDWIDTH	=	40 SECONDS
COORDINATION SPEED	=	45 MPH



SCHEMATIC OF INTERCONNECT SYSTEM

COORDINATION DATA NOTES:

1. COORDINATION REFERENCE POINT SHALL BE AT THE START OF THE ROUTE 9 EASTBOUND AND WESTBOUND YELLOW, PHASE 2 & PHASE 6 (THROUGH MOVEMENTS).
2. DURING COORDINATION, MAINLINE GREEN TO BE CALLED, NOT ACTUATED.
3. SYSTEM 1 LOCAL MASTER REFERENCE LOCATION IS ROUTE 9/LANGLEY ROAD INTERSECTION (LOCATION C1).
4. ON–STREET SYSTEM MASTER CONTROLLER LOCATED AT ROUTE 9/HAMMOND STREET INTERSECTION (LOCATION C4).

HOR. SCALE IN FEET
SCALE: 1"=100'
0 100 250 500
0 20 50 100
VERT. SCALE IN SECONDS
SCALE: 1"=20 SECS

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

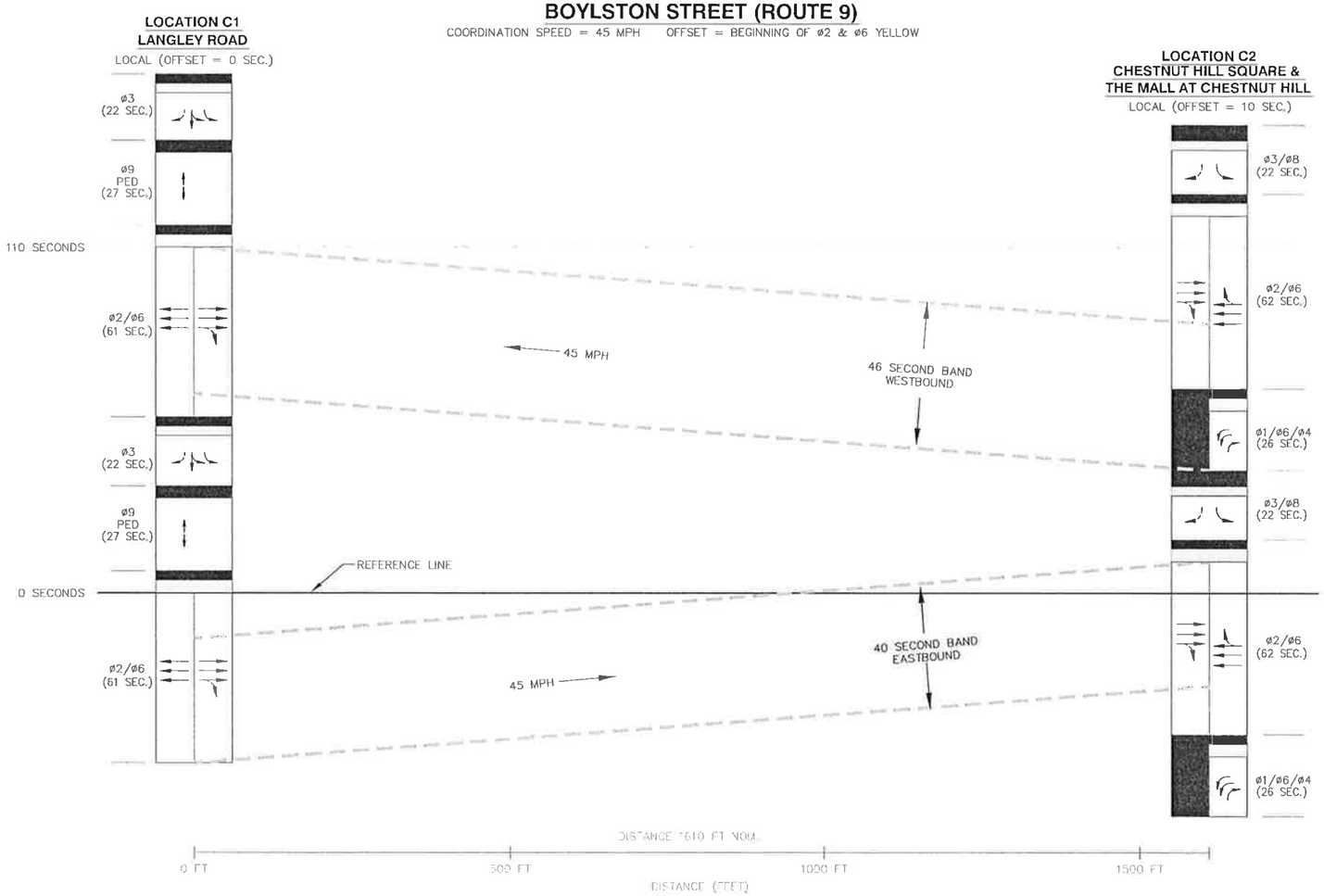
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	51	108
PROJECT FILE NO.			

TIME SPACE DIAGRAMS
SYSTEM 1
TIMING PLAN 2
WEEKDAY PM

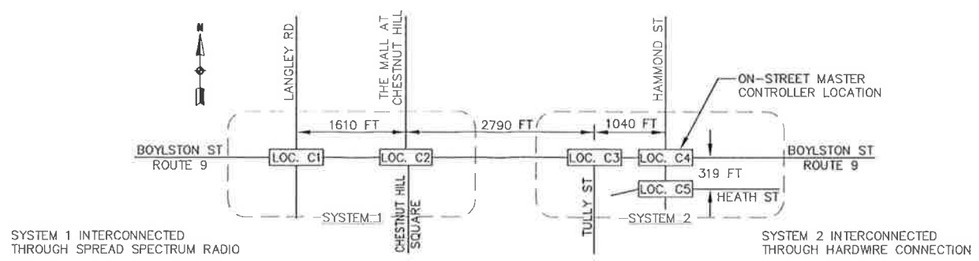
SYSTEM 1 - TIMING PLAN 2
WEEKDAY PM PEAK PERIOD (3:00 PM - 7:00 PM)

BOYLSTON STREET (ROUTE 9)

COORDINATION SPEED = 45 MPH OFFSET = BEGINNING OF ø2 & ø6 YELLOW



CYCLE LENGTH	=	110 SECONDS
BOYLSTON STREET (ROUTE 9):		
EB BANDWIDTH	=	40 SECONDS
WB BANDWIDTH	=	46 SECONDS
COORDINATION SPEED	=	45 MPH



SCHEMATIC OF INTERCONNECT SYSTEM

COORDINATION DATA NOTES:

1. COORDINATION REFERENCE POINT SHALL BE AT THE START OF THE ROUTE 9 EASTBOUND AND WESTBOUND YELLOW, PHASE 2 & PHASE 6 (THROUGH MOVEMENTS).
2. DURING COORDINATION, MAINLINE GREEN TO BE CALLED, NOT ACTUATED.
3. SYSTEM 1 LOCAL MASTER REFERENCE LOCATION IS ROUTE 9/LANGLEY ROAD INTERSECTION (LOCATION C1).
4. ON–STREET SYSTEM MASTER CONTROLLER LOCATED AT ROUTE 9/HAMMOND STREET INTERSECTION (LOCATION C4).

HOR. SCALE IN FEET
SCALE: 1"=100'
0 100 250 500
0 20 50 100
VERT. SCALE IN SECONDS
SCALE: 1"=20 SECS

NEWTON–BROOKLINE
BOYLSTON STREET (ROUTE 9)

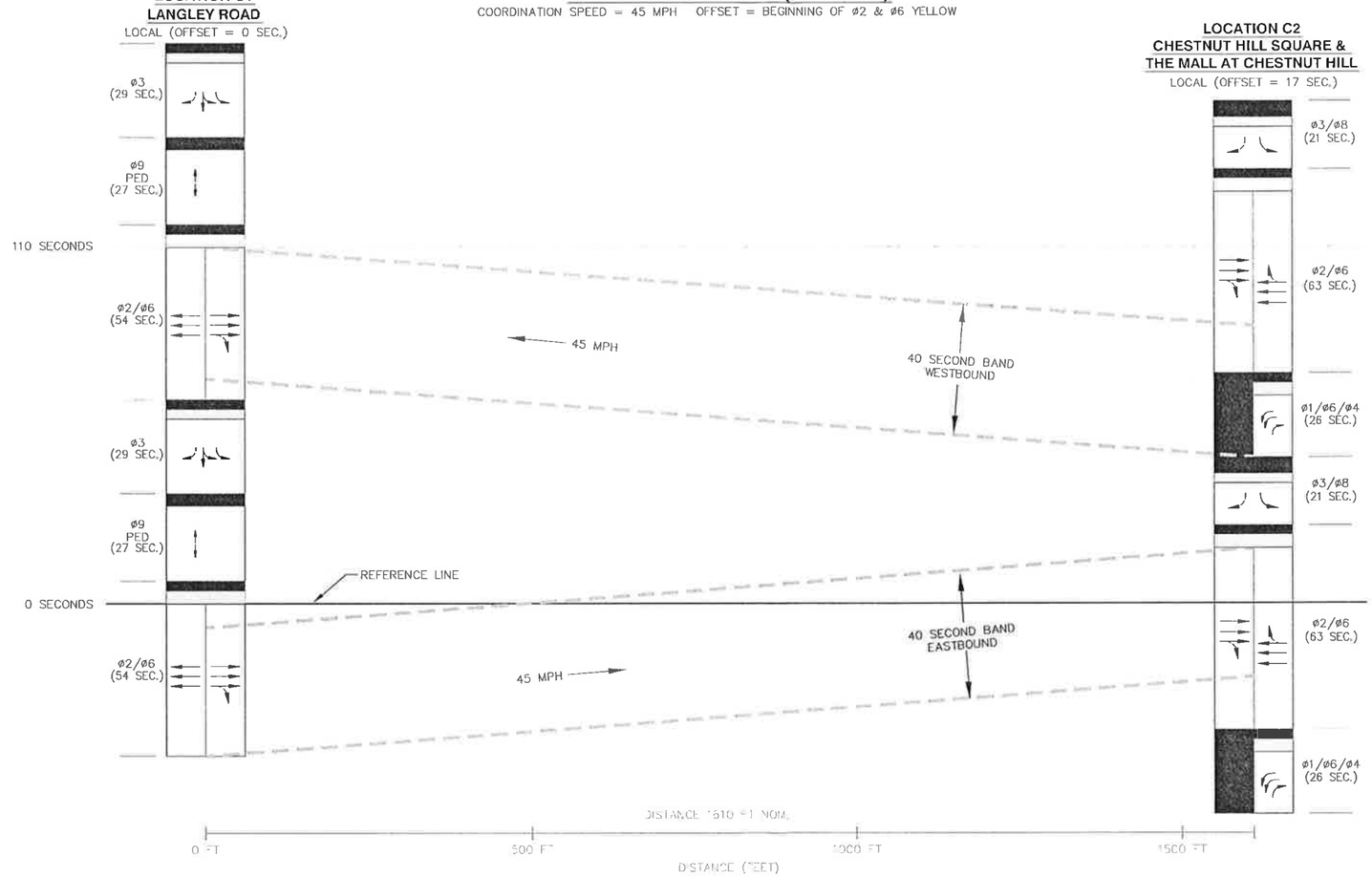
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MASS.	N.F.A.	52	108
PROJECT FILE NO. -------			

TIME SPACE DIAGRAMS
SYSTEM 1
TIMING PLAN 3
SATURDAY MIDDAY

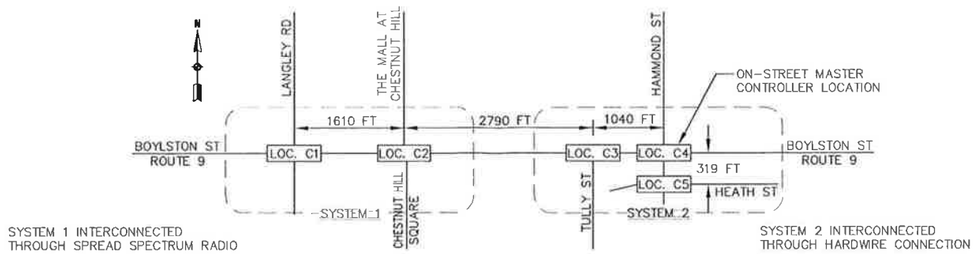
SYSTEM 1 - TIMING PLAN 3
SATURDAY MIDDAY PEAK PERIOD (11:00 AM - 6:00 PM)

BOYLSTON STREET (ROUTE 9)

COORDINATION SPEED = 45 MPH OFFSET = BEGINNING OF ø2 & ø6 YELLOW



CYCLE LENGTH	=	110 SECONDS
BOYLSTON STREET (ROUTE 9):		
EB BANDWIDTH	=	40 SECONDS
WB BANDWIDTH	=	40 SECONDS
COORDINATION SPEED	=	45 MPH



SYSTEM 1 INTERCONNECTED THROUGH SPREAD SPECTRUM RADIO

SYSTEM 2 INTERCONNECTED THROUGH HARDWIRE CONNECTION

SCHEMATIC OF INTERCONNECT SYSTEM

COORDINATION DATA NOTES:

1. COORDINATION REFERENCE POINT SHALL BE AT THE START OF THE ROUTE 9 EASTBOUND AND WESTBOUND YELLOW, PHASE 2 & PHASE 6 (THROUGH MOVEMENTS).
2. DURING COORDINATION, MAINLINE GREEN TO BE CALLED, NOT ACTUATED.
3. SYSTEM 1 LOCAL MASTER REFERENCE LOCATION IS ROUTE 9/LANGLEY ROAD INTERSECTION (LOCATION C1).
4. ON–STREET SYSTEM MASTER CONTROLLER LOCATED AT ROUTE 9/HAMMOND STREET INTERSECTION (LOCATION C4).

HOR. SCALE IN FEET
SCALE: 1"=100'
0 100 250 500
0 20 50 100
VERT. SCALE IN SECONDS
SCALE: 1"=20 SECS

ITEM 815.1-A	TRAFFIC CONTROL SIGNAL LOCATION NO. C2	LUMP SUM
ITEM 816.01-A	TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. C1	LUMP SUM
~~ITEM 816.02~~	~~TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. C3~~	~~LUMP SUM~~
~~ITEM 816.03~~	~~TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. C4~~	~~LUMP SUM~~
~~ITEM 816.04~~	~~TRAFFIC SIGNAL RECONSTRUCTION LOCATION NO. C5~~	~~LUMP SUM~~

The work under this Item shall conform to the relevant provisions of Section 800 of the Standard Specifications and the following:

Location C1 is the intersection of Route 9 at Langley Road
Location C2 is the intersection of Route 9 at Chestnut Hill Square and the Mall at Chestnut Hill Drives
Location C3 is the intersection of Route 9 at Tully Street
Location C4 is the intersection of Route 9 at Hammond Street
Location C5 is the intersection of Hammond Street at Heath Street

~~Under the Base Bid the Contractor shall install all signal equipment furnished by the City of Newton for Locations C1 and C2, construct mast arm foundations in accordance with the details included in the plans; construct foundations and concrete pads for traffic signal controller cabinets, furnish and install all signal equipment for Locations C-3, C-4 & C-5; and provide a complete, fully operational, coordinated, closed-loop traffic signal system at Locations C1, C2, C3,C4 and C-5 as specified herein and as shown on the plans.~~

Under the Add Alternate Bid the Contractor shall furnish all traffic signal equipment listed on the Major Items Lists for Locations C1 and C2 with the exception of the electric service connection, mast arm foundations, and the foundation and concrete pad for the traffic signal controller cabinet.

All work under these items shall conform to the relevant provisions of Section 800 of the Standard Specifications, the 2009 Manual on Uniform Traffic Control Devices (MUTCD), and the following. These provisions are presented under major subheadings as follows: 1) General Requirements for Local Intersection Control Equipment, 2) Local Intersection Controllers, 3) Video Detection System, 4) Closed Loop Traffic Control System, and 5) Accessible Pedestrian Signals. The work includes furnishing all labor and materials to install the local controllers, spread spectrum radio communication system, cabinets and foundations; mast arms, anchor bolts and foundations; signal posts and foundations; signal heads; video detection cameras; emergency preemption systems; pull boxes; all cable and wiring; ground rods, equipment grounding and bonding; service connection; and all other equipment and materials at Locations C1 and C2 necessary to provide a complete, fully operational, coordinated, closed-loop traffic control signal system as specified herein and as shown on the plans. The work also includes reprogramming the existing traffic controllers and replacement of pedestrian signal heads at Locations C3 through C5 and installing a spread spectrum radio communication system as shown on the plans to extend the existing closed loop traffic signal system west on Route 9.

Also, the local controllers at Locations C1 and C2 shall be compatible with and be able to communicate with the existing master controller at Location C4 via spread spectrum radio.

1) General Requirements for Local Intersection Control Equipment

Before beginning ANY traffic signal work, the individual or contracting organization responsible for any portion of the traffic signal construction shall demonstrate to the Engineer personal possession in the field of all of the following documents:

1988 "Massachusetts Highway Department Standard Specifications for Highways and Bridges"
February 25, 2010 Supplemental Specifications to the 1988 Standard Specifications
2009 Manual on Uniform Traffic Control Devices with all Amendments
1968 Standard Drawings for Traffic Signals and Highway Lighting
1990 Standard Drawings for Signs and Supports
All contract drawings showing traffic signal details or traffic signal design
All contract special provisions

A list of the major traffic signal items required is included on the Plans. All traffic signal equipment installed on this project shall be included on the MassDOT Highway Division Traffic Signal Approved Equipment List.

Within thirty days following execution of the contract, the Contractor shall submit shop drawings for signal supports, a list of equipment, and manufacturer's equipment specifications to the Engineer in accordance with the relevant provisions of Section 815.20.

No work shall be commenced by the Contractor until approval of the shop drawings and the manufacturer's data has been received in writing from the Engineer. Approval of these drawings will be general in character and shall not relieve the Contractor from the responsibility of, or the necessity of, furnishing materials and workmanship conforming to the plans and specifications.

The Contractor shall deliver to the Engineer a Certificate of Compliance with the manufacturer for *all* materials purchased from the manufacturer.

Existing Installations

Existing signal installations shall be maintained in operation throughout the construction period and until the new signal system is ready for operation. The Contractor shall construct temporary supports for signal heads as required to allow construction activities. Any temporary installation shall be in conformance with the MUTCD at all times. If an existing signal is to be turned off temporarily to allow controllers to switch over or for any other reason, a police detail shall be used to control traffic at the intersection.

Flashing Operation

Changes from flashing to stop-and-go operation and from stop-and-go to flashing operation shall occur as set forth in the MUTCD.

Signal Heads

Signal heads shall have yellow housings with black doors. All signal head indications shall be state approved LED.

Traffic Signal LED Module

All signal and pedestrian displays shall be equipped with light emitting diode (LED) signal modules. All red, amber, green, and pedestrian signal housings with the exception of optically programmed and fiber optic housings shall conform to the following where applicable:

- ITE's Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Arrow Traffic Signal Supplement, Dated April 3, 2006.
- ITE's Vehicle Traffic Control Signal Heads – Light Emitting Diode (LED) Circular Signal Supplement, Dated June 27, 2005.
- ITE's Pedestrian and Countdown Signal Modules Compliant to PTCSI - Part 2 Light Emitting Diode (LED), Dated, August, 2007.
- Energy Star / EPACT Program Requirements for Traffic Signals
- On the MassDOT Traffic Signal Approved Equipment List

An independent lab shall certify that the LED signal module complies with the applicable ITE specification. The independent report should be submitted to MassDOT for review unless the module is already on the approved list.

To prevent the LED module warranty from being voided, the connecting leads on the module shall not be cut. The original LED module leads shall be connected to the signal head terminal block as continuous wire without splices.

The LED signal module will be replaced or repaired by the manufacturer if it exhibits one of the following:

A failure due to workmanship or material defects within the first 60 months of field operation

A greater than 40 percent light output degradation or a fall below the minimum intensity levels (as defined by the latest ITE performance specifications) within the first 36 months of field operation

Pedestrian Signal Heads

New pedestrian signal heads shall be 16 inch x 18 inch one-section man/hand overlay LED-type displaying the graphical hand or person (solid), with countdown timer, in accordance with the plans.

Posts and Bases

Signal posts shall have steel shafts, 8, 10, or 20 feet in height, with transformer bases. Signal base foundations shall not obstruct sidewalks or crosswalks.

Mast Arm Structures and Foundations

The mast arm structures and foundations shall be fabricated and constructed in conformance with the MassDOT Highway Division standard drawings included in the plans.

Mast arms shall be galvanized steel structures. Longhand design calculations and shop drawings shall be submitted by the contractor for all mast arms. As part of these long-hand calculations, the moment shall be calculated with respect to the elevation of the proposed mast arm foundation top, the roadway clearance requirements, and the resultant mast arm height(s).

Mast arm base foundations shall not obstruct sidewalks or crosswalks.

Signal heads and signs shall be rigidly mounted at the same height, with hangers varying in depth as required.

The mast arm foundation sizes and depths shall be selected from the Mast Arm & Foundation Details Standard Drawings for the appropriate loading condition based on the soil type noted on the boring log.

All measurements to determine the exact dimensions and clearances between the mast arm structures and existing overhead utility lines shall be made in the field by the Contractor in the presence of the Engineer for incorporation into the erection plans and shop drawings which are submitted for approval.

Optical Preemption

Operation

An optical preemption system shall be included at Locations C1 and C2. The City of Newton standard OPTICOM Priority Control System shall be furnished and installed in the same cabinet as the controller.

The following description of work specifies the responsibilities involved in the installation of optical preemption.

The Contractor is required to supply all material and labor, as shown on the plans for the complete installation of optical preemption equipment at the specified locations in this project. Intersection preemption equipment required includes optical receivers, cable, interfacing equipment to the local controller, surge protection equipment, making electrical connections, and all required incidentals.

The following are the operational requirements of the optical preemption system:

- Emergency Vehicle Design Speed for all preemption controlled approaches shall be 45 mph.

- Operating sequence as specified shall be initiated when the optical receiver receives optical energy of the required repetition rate from an emitter.

- Receiver shall transform the optical energy signals into electrical signals and transmit the electrical signals to the local controller for processing.

- The emergency preemption system shall prioritize multiple calls from authorized vehicles.

The optical receiver cable shall meet the specifications of the system manufacturer.

The Contractor shall arrange for a trained representative of the manufacturer of the optical energy preemption equipment to perform the following field supervision and turn-on services:

- The representative shall select the proper quantity and method of installing all components to comply with the operational requirements shown in the preemption schedule included in these Special Provisions.

- The representative shall instruct Contractor and owner personnel in the procedures of installation.

- The representative shall be available to assist, supervise, and check all wiring to ensure proper operation.

- The representative shall perform a final check to include initial adjustment of range and timing to acceptable standards within the capabilities of each intersection.

- The representative shall initiate documentation for as-built drawings.

- The representative shall demonstrate the system and instruct the drivers of authorized emergency vehicles in the operation of the system.

- The representative shall instruct maintenance personnel in routine maintenance and minor troubleshooting of the system.

- Any operation problems occurring within the next thirty days shall be corrected by the Contractor or by a Field Service representative if the Contractor cannot do so. This requirement is not intended to modify the Contractor's twelve-month guarantee obligation, as set forth in an earlier portion of these Special Provisions.

The cost of these field supervision and turn-on services shall be included in the Lump Sum Bid Price, and no additional payment shall be made therefore.

Preemption System Design and Documentation shall include the following:

- Provide the installing agency with location for receiver installation.
- Provide the controller manufacturer, Engineer, and owner with electrical diagrams.

The installer shall install the equipment consistent with the preemption equipment, the manufacturer's recommended installation procedures and electrical diagrams in a neat and workmanlike manner.

The preemption equipment manufacturer shall be responsible for operational checkouts of the specified preemption functions prior to final acceptance and approval by the Engineer.

Operating checkout includes the following:

- Verifying that the priority system timing and range are properly set.
- Preemption equipment warranties are put into effect.

2) Local Intersection Controller

The new local intersection controllers shall be Type 8DW TS2-Type 1 controllers with time-based coordination and closed-loop system capability.

The local intersection controller shall be capable of controlling a fully actuated two- to eight-phase intersection and shall meet or exceed NEMA TS 2 standards for fully actuated traffic control units. The local controller shall have internal communication capability with direct access to the data memory. The local system controller shall be capable of processing controller, intersection and system detection data and provide all required intersection control functions. The required local controller timebase coordination and preemption functions shall be internal in the timing unit.

New cabinets shall be made of aluminum and shall comply with Section 7 of the specifications set forth in NEMA TS-2, 1998.

The local system intersection controller shall include all of the following internal functions:

1) software compatible with the control and data protocol of an on-street master, central-office computer and field laptop computer; 2) local time base scheduler including automatic accommodation for daylight savings time; 3) local coordination control; 4) local preemption control with at least four programmable internal preemption sequences; 5) data uploading and downloading capability; 6) process system and local intersection detector activity and accumulate samples of vehicle counts, occupancy, speed, stops, and delay; 7) perform extensive failure evaluation of the controller, detectors, and communications; 8) provide local control of remotely selected NEMA and special functions; 9) perform local report generation with printer capability if a printer is attached, including intersection status and performance; and 10) Automax/max

extend capable of being programmed to automatically add a max extend value to the max timer, up to a settable limit called Automax, when the associated phase maxes out twice in a row. Conversely, a max extend value would be subtracted upon two gap outs in a row, down to the programmed max value, including max plans if used.

Each new local system intersection controller shall include an internal fiber-optic modem. An
RS-232C interface or any other physical type interface with RS-232C logic and electrical characteristics shall be provided in or with the local controller to allow for local printing of reports and for interconnecting to a remote master controller through the modem.

To minimize training and simplify local programming, all local parameter access shall utilize prompting and English language displays, and all codes needed by the user, if any, shall be on the front panel or on the display screen to avoid the need for memorization or the presence of a manual.

Testing of Grounding System

The Contractor shall perform testing of the equipment grounding system in the presence of the Engineer in accordance with the Standard Specifications.

Malfunction Management Unit (MMU)

The MMU shall meet Section 4 requirements set forth in NEMA TS-2 specifications, 1998. The MMU shall be compatible with a NEMA TS-2 Type 1 traffic signal controller. The MMU shall provide a means of displaying the real time status of operating parameters such as the time and date, compatibility card programming, functional inputs, and the status of MMU switch settings.

The MMU shall provide a settable internal ninety-nine-year clock. This clock shall automatically adjust for daylight savings time. This requirement shall be accomplished by a user programmable function.

3) Video Detection System

This Supplemental Specification provides for the furnishing and installation of video detection at Locations C1 and C2.

Description

1.1 This specification sets the minimum requirements for a wide-area vehicle detection system that processes video images for vehicle presence, count, speed, and other typical traffic parameters. The detection of vehicles passing through the field of view of an image sensor shall be available to a large variety of end user applications as simple closure outputs, data for a traffic controller, and other traffic data. This reflects

the current real time detector or alarm states (on/off) or as summary traffic statistics that are reported locally or remotely. Contact closure outputs shall be provided to a traffic signal controller and comply to the NEMA (National Electrical Manufacturers Association) type C or D detector rack or a Type 170 input file rack standards.

1.2 The system architecture shall fully support networking of system components through a variety of industry standard and commercially available infrastructure that are used in the traffic industry. The serial data communications shall support direct connect, modem, and multi-drop interconnects.

1.3 The system shall be integrated through a client-server relationship. A communications server application shall provide the data communications interface between as few as one to as many as hundreds of machine vision processor (MVP) sensors using the industry standard TCP/IP network protocol. Communications protocol for the proposed machine vision system must be compatible with the existing machine vision system infrastructure to support current data collection processes.

Materials

2.1 All materials furnished, assembled, fabricated, or installed shall be new, corrosion resistant, and in strict accordance with the details shown in the plans and in the Special Provisions. All equipment furnished under this item shall be current production equipment, identical models of which are field operational.

2.2 Functional Requirements:

2.2.1 All MVP Processors and components shall be of the same type and from the same manufacturer.

2.2.2 The MVP sensor shall communicate with the cabinet interface module, communications interface panel and the various PC applications using the industry-standard TCPIIP network protocol. Additionally, one or more PCs shall communicate directly or remotely to a MVP sensor network where each MVP sensor has a unique Internet Protocol (IP) address. The MVP sensor network shall support communications over a mix of media, including PSTN, CDPD, CDMA, dedicated twisted-pair, fiber, and wireless.

2.2.3 The communications interface panel shall support one to four MVPs. The communication interface panel in the cabinet shall provide electrical termination of external cables for video, data and power to the MVP sensor. The communication interface panel shall provide transient protection to electrically protect equipment in the cabinet. The communications interface panel will provide two separate channels for supervisory connectivity via a single DB9 Male serial port and RJ-45 Ethernet Port. The use of Serial to Ethernet converters will not be acceptable. The communications interface panel consists

of a predefined wire termination block for MVP power, data and video connections, a power transformer for the MVP, electrical surge protectors to isolate the modular cabinet interface unit and MVP, and an interface connector to cable directly to the modular cabinet interface unit. The connection from the MVP(s) to the communications interface panel shall be via the manufacturers supplied 5½ twisted pair cable with connector to sensor. Coaxial cable is not needed and will not be accepted. If a splice is needed, contractor shall supply manufacturers recommended 5½ twisted pair splice cable. The interface panel shall provide power for one to four MVP(s) through a step-down transformer, one per MVP, taking local line voltage and producing 28 VAC, 50/60 Hz, at about 30 watts. A ½ amp slowblow fuse shall individually protect the step-down transformers.

2.2.4 The cabinet interface module shall communicate directly with up to eight (8) MVP sensors and shall comply with the form factor and electrical characteristics of a NEMA type C or D detector rack or a 170 input file detector rack card. For a contact closure interface to a traffic controller or other device, this interface shall accept eight (8) contact closure inputs (usually red and green control signals), and provide sixteen (16) contact closure outputs to a traffic signal controller. For a SDLC interface to a NEMA TS2 traffic controller, this interface shall display 32 phase colors and emulate up to four (4) bus interface units (BIU).

2.3 Camera Extension Bracket:

- Truss type
- Length shown on plan
- Clamp on attachment to pole shaft.
- Design to support minimum 25 lbs. (12kg), 2 sq. ft. (0.2sq.m) end load with minimal movement from wind.
- Schedule 40, 2 inch (50 mm) IPS galvanized pipe.
- Heavy duty galvanized finish to match the color of the Pole/Mast arm.

2.4 Machine Vision Processor (MVP), Communications Interface Panel (CIP), Cabinet Interface Module:

2.4.1 Machine Vision Processor (MVP) sensor:

Machine Vision Processor shall meet the following requirements:
Lens
- 22X continuous-focus zoom
- Horizontal: 5 to 74 degrees
- Vertical: 4 to 59 degrees

Imaging Device
- ¼ inch color CCD

Video Formats Supported

- RS170, NTSC, CCIR and PAL

Video Compression

- JPEG color video compression (software)

Resolution

- 450 TVL Horizontal

Effective Pixels

- NTSC :768(H) x 494(V) [380k]
- PAL: 752(H) x 582(V) [440k]

Synchronization

- Crystal lock

Sensitivity-at Lens

- Full video, AGC off, 3 lux

Signal to Noise Ratio

- 46 dB

Communications

- Connector: MS 14-18P
- Internet Protocol (IP) address
- RS-485 communications port
- RS-485 detector port
- Differential color video port

Housing & Sunshield

Image sensor and MVP sealed in a waterproof and dust-tight enclosure. Thermostatically controlled faceplate heater. Adjustable weather and sun-shield with drip guard.

Power

- RS170/NTSC: 24 VAC 60 Hz
- CCIR/PAL: 24 VAC 50 Hz
- 10 to 28 VDC
- 17 watts with heater on

Dimensions

- Mounting: Standard camera bracket tilt top provided
- Housing Enclosure: 3.5 inch diameter, 15.5 inch long
- Weather sunshield: 21.3 inch long

Weight

- 5 lbs. 14 oz.

Ambient Temperature Limits

- -34°C to +60°C /-29°F to +140°F

Humidity Limits

- Up to 100% relative humidity, non-condensing

2.4.2 Communication interface panel:

Communications Interface Panel shall meet the following requirements:

- 32-Bit NET+ARM high performance RISC Processor (NS7520 55MHz)
- High Speed TTL Serial Interface
  - o Throughput up to 230,400 bps,
  - o Full signal support for TXD,RXD,RTS,CTS,DTR,DSR, and DCD,
  - o Hardware and software flow control
- 2MB Flash and 8MB RAM integrated,
- Auto-Sensing 10/100Base-T network interface with on-board RJ-45 connector,
- Robust on-board IP Stack: TCP, UDP, DHCP, SNMP, SSL/TLS, HTTP, SMTP, ICMP, IGMP and ARP,
- Firmware field-upgradeable via HTTP,
- Secure web-based configuration (HTTP/HTTPS),
- Universal IP address assignment,
- Configuration and management through SNMP (read/write),
- Strong SSL V3.O/TLS V1.0 based encryption capable:
  - o DES (56 bit)
  - o 3DES (168 Bit)
  - o AES (128/256 Bit)
- Ethernet Connectivity Upstream:
  - o RJ-45 Connector,
- Local Supervisor Port:
  - o Single DB9 Male Connector,
- Remote Supervisor Capability,
  - o Network Browser via Ethernet RJ-45,
- Detector Communications Port
  - o Single DB9 Female Connector,
- Video Outputs
  - o Four Standard 75-Ohm BNC Video Connectors,
- MVP Terminations
  - o Four sets of 11 compression terminals,
- Line Power
  - o 3 Position Compression Block.

2.4.3 Cabinet interface module:

Cabinet Interface Module - 8 MVP Mini-Hub (Option 1 without SDLC Bus or Option 2 with SDLC Bus depending on cabinet configuration) shall meet the following requirements:

Option 1
Outputs

- 16 optically-isolated NEMA TSl/TS2 outputs.

Inputs

- 8 optically-isolated inputs to monitor signal controller phases or other conditions.

Connectors

- Female 9-pin metal shell D subminiature connector with female jackscrews.
- Female 25-pin metal shell D subminiature connector with female jackscrews.
- Cinch Jones 50-44A-30M edge connector.

Power

- 20 to 28 VDC, 100 milliamps, not exceeding 5 watts (Operates at 24 VDC as allowed in section 5.3.4.5 of the TS2 standard)

Option 2

TS2 Capability

- Fully complies with NEMA Publication Standard TS2-1998.

Connectors

- Female 15-pin metal shell D subminiature connector with latching blocks.
- Female 9-pin metal shell D subminiature connector with female jackscrews.
- Cinch Jones 50-44A-30M edge connector.

Power

- 10 to 28 VDC, 100 milliamps, not exceeding 5 watts (Operates at 24VDC or at 12VDC as in section 5.3.4.5 of the TS2 standard).

2.5 Functional Capabilities

2.5.1 MVP Image Sensor

The MVP image sensor shall be an integrated imaging color CCD array with optics, high-speed, image processing hardware and a general purpose CPU bundled into a sealed enclosure. The CCD array shall be directly controlled by the general purpose CPU, thus providing high video quality for detection that has virtually no noise to degrade detection performance. It shall be possible for the user to zoom the lens, as required for operation. It shall provide software JPEG video compression and a video compression co-processor so as not to interfere with detection performance while streaming video. The MVP shall provide direct real-time iris and shutter speed control. The MVP image sensor shall be equipped with an integrated auto zoom/auto focus lens that can be changed using computer software.

The MVP sensor shall output full motion color video through the means of a differential video port in NTSC format. The differential video is transmitted over a single twisted pair.

Real-time detector performance shall be observed by viewing the video output

from the sensor with overlaid flashing detectors to indicate the current detection state (on/off). Real-time speeds and classifications shall also be visible through streaming video via the video player and from full motion video.

2.5.2 Video Outputs

The MVP shall provide color video output from the interface panel for real-time NTSC or PAL display on a monitor or PC over standard coax cable. The software shall also display streaming video as part of the user software based on JPEG video compression or optional hardware-based wavelet video compression. The streaming video shall be recordable as a data file on the PC for later playback and editing.

2.6 Camera Cable

The MVP Color Camera / Integrated Machine Vision processor cable shall use Five and ½ unshielded twisted pairs cable. Overall shield shall be provided. The cable shall supply the Data and Video Signal to the CIP and 24VAC power to the camera. Coaxial cable will not be allowed from MVP to traffic control cabinet.

Construction Requirements

3.1 System Software

The MVP sensor's embedded firmware shall automatically perform a variety of diagnostic, installation, fault tolerant, and vehicle detection operations. Vehicle detection shall be reliable, consistent, and perform under all weather, lighting and traffic congestion conditions.

3.2 Functional Requirements

A software suite of client applications shall reside on the host client / server PC. The software suite shall support Microsoft Windows 98, ME, XP, NT, 2000 and later operating systems. Client applications shall include:

3.2.1 Network Browser:
Learn a network of connected modular cabinet interface units and MVPs then show the topology in a logical hierarchical relationship.

3.2.2 Detector Editor:
Create and modify detector configurations to be executed on the MVP sensor.

3.2.3 Operation Log:
Extract the MVP run-time operation log of special events that have occurred.

3.2.4 Software Installer:
Reconfigure one or more MVP sensors with a newer release of embedded system software.

3.2.5 Video Player:
Play streaming color video from any or all sensors connected to network. Video player shall also have the ability to go in to a video wall option which will divide the PC screen in as many sensors that are opened giving the user optimal viewing. The video player shall also be able to record and play back any or all sensors being viewed.

3.2.6 Video Controller:
Control the zoom, pan & tilt (optional) of the sensor it is controlling. Multiple sensors shall be able to be viewed or controlled at the same time. If multiple sensors are being viewed simultaneously, the video controller application shall allow the user to enlarge the screen in to a video wall option, which will split up the whole screen with the number of sensors being viewed.

3.3 Detection Types

The MVP shall be able to be programmed with a variety of detector types that perform specific functions. The general functions performed by the detectors shall:

- Include presence/passage detection of moving and stopped vehicles.
- Enable detection based on the direction of travel or based on when a moving vehicle stops.

3.4 Detection Zone Programming

Placement of detection zones shall be by means of a supervisor computer (PC) operating in the Windows 98, ME, XP, NT, 2000 or later graphical environments, a keyboard, and a mouse. The VGA monitor shall be able to show the detection zones superimposed on images of traffic scenes.

The detection zones shall be created and/or edited by using a mouse to draw detection zones on the supervisor computer's VGA monitor. Using a mouse and the keyboard it shall be possible to place, size, and orient detection zones to provide optimal road coverage for vehicle detection. It shall be possible to download detector configurations from the supervisor computer to the MVP, to retrieve the detector configuration that is currently running in the MVP, and to back up detector configurations by saving them to the supervisor computer's removable or fixed disks.

3.5 System Installation

The supplier of the video detection system shall supervise the installation and testing of the video detection system and computer equipment. A factory certified representative from the

supplier shall be on-site during installation.

3.6 Warranty, Service and Support

Video Detection manufacturer for a minimum of two (2) years shall warrant the video detection system including all software upgrades free of charge for duration of warranty period.

4) Closed Loop Traffic Control System

Work for the closed loop traffic control system shall conform to the relevant provisions of Section 800 of the Standard Specifications, the 2009 MUTCD, and the following technical provisions. These provisions are presented under six major subheadings as follows: a) General, b) Interconnection (Communications) System, Telemetry Links, and Sampling Detectors, and c) Database Programming.

a) General

The work shall include furnishing and installing a closed loop type traffic control system at Locations C1 and C2 as an extension of the existing system at Locations C3 through C5, with all other appurtenances required to interface, connect, and operate in a completely functional manner a traffic control system integrated with the specified local intersection controllers and with the central office personal-type computer facility.

b) Interconnection (Communications) System, Telemetry Links, and Sampling Detectors

The communications links for the "closed-loop" system shall provide the medium for two-way communications between the on-street master and the local intersection controllers. Error checking shall be included in these mediums to assure transmission and reception of valid data.

Communications between the existing on-street master (Location C4) and the local intersection controllers for Locations C1 and C2 shall provide full period connection via user-owned Ethernet spread spectrum radio.

c) Database Programming

Each Programmable local or master hardware component (including but not limited to controller, conflict monitor, preempt unit, and detector amplifier) shall be initially programmed by the Contractor. See the master schedule(s) and local intersection operation schedules shown on the plans. Additional programming data may be furnished by the design engineer at the time of initial operation and field-adjusted as necessary during the inspection and fine tuning period. The Contractor shall supply three sets of hard copy programming per device to the owner of the system.

Complete computer database programming shall also be performed by the Contractor, including text, map configurations, systems map functions, all other graphics, volume, event and MOE logging, and all other data required to supply and turn on a fully operational closed-loop signal system complete with time-of-day, day-of-week, day-of-year, holiday, and traffic responsive data.

5) Accessible Pedestrian Signals

This Supplemental Specification provides the requirements of accessible pedestrian signal pushbuttons at Locations C1, C2, C3 and C4.

The Accessible Pedestrian Pushbutton (APS) shall provide information in a non-visual format. The format shall include, but not be limited to, audible tones, speech messages, as well as vibrating surfaces. APS pushbuttons shall be compliant with the 2009 MUTCD and shall provide the following features:

- Pushbutton locator tone
- A visible and audible confirmation indicator, such as a light and speech message, that the button has been pressed
- A vibro-tactile arrow
- A speech walk message when the "WALKING PERSON" indication is shown

The APS pedestrian pushbutton shall provide visually disabled pedestrians with a locator tone that will assist them in finding the pedestrian pushbutton to activate the walk signal. Once pressed, and the WALK signal has been initiated, the pedestrian pushbutton shall provide an audible and tactile response during the "WALK" interval. An LED shall come on to confirm the button has been pushed and the audible response shall be a message that indicates the name of the street crossing and when the "WALK" phase has started.

The APS housing and pushbutton unit shall meet the following minimum requirements:

- Constructed of cast aluminum with a powder coat finish
- Unit shall be pressure activated with no moving parts
- Pushbutton must be vandal resistant and must be able to withstand significant blunt force, such as impact from a hammer or baseball bat.
- The unit must be able to operate between a temperature range of -34 degrees Celsius and 65 degrees Celsius
- Operating Voltage range shall be between 12 to 65 volts.
- Pushbutton shall be activated with a force of 5 Lbs. or less
- LED confirmation light that indicates that the button has been pressed
- APS Unit shall be designed so that ice is not allowed to form which would impede function of APS unit
- All electronics shall be sealed within the APS unit
- Speaker for APS unit shall be a weatherproof unit with a vandal resistant screen.

- APS pushbutton shall be 2 inches in diameter.

Tactile Arrows and Locator tones shall meet the following minimum requirements:

- The locator tone shall be located at the pushbutton
- The locator tone sound measured at three feet from the APS pushbutton shall be a minimum of 2 dB and 5 dB maximum above the ambient noise level. The locator tone shall be responsive to ambient noise level changes. Tones shall consist of multiple frequencies with a component of 880Hz and the duration shall be 0.15 sec. and repeat at 1 sec. intervals.
- The vibro-tactile arrow shall be aligned parallel to the crosswalk direction. The arrow shall be raised and shall be a minimum of 1.5 inches in length. Arrow shall have high visual contrast with the background.
- Arrow shall vibrate during the "WALK" interval
- Speech walk message shall be audible from the beginning of the associated crosswalk interval.
- The maximum mounting height of the APS button shall be 42 inches above the finished sidewalk.

The APS pedestrian pushbutton shall be installed as recommended by the manufacturer and documented in installation materials provided by the manufacturer. The Contractor and or manufacturer shall be responsible for the proper programming of the APS pushbuttons, the correct orientation of the pushbutton, as well as adjusting of the volume levels and all other work necessary to provide a complete and operational pushbutton system.

The Contractor or manufacturer shall supply one hand held remote configuration unit to MassDOT which will allow adjustment and or configuration of locator tones, audible messages and custom walk sounds. The unit shall use infrared technology with an LCD display to program the APS pushbuttons. The unit shall be password protected.

The Contractor or manufacturer shall provide 4 hours of training at the MassDOT District 6 office. Each APS pedestrian pushbutton shall have a warranty that the unit will be free from defects in material and workmanship for a period of two years after being accepted by MassDOT.

Fine Tuning, Adjustment, and Testing Period

After the Contractor has finished installing the controller and all other associated signal equipment and after the Contractor has set the signal equipment to operate as specified in the contract documents, the fine tuning, adjustment and testing period shall begin. During this period, the Contractor, under the direction of the Engineer, will make necessary adjustments and tests to ensure safe and efficient operation of the equipment. Final acceptance will not be made until the system has operated satisfactorily, as designed, for a period of *not less than* 30 days from a date designated by the Engineer.

Guarantee After Final Acceptance

The Contractor shall troubleshoot, repair, and/or replace any equipment installed in conjunction with this contract at his own expense if found to be defective in workmanship, material, or manner of functioning within a period of six months from the date of final acceptance of this contract by the MassDOT Highway Division.

The Contractor shall provide technical services to maintain, operate, and adjust the closed-loop coordinated system as needed for a one-year period following the date of final acceptance.

Basis of Payment

The work under these items will be paid for at the respective Contract unit prices per lump sum, which prices shall include all labor, materials, equipment and incidental costs required to complete the work.

No separate payment will be made for the maintenance of the existing signals during construction or for the removal, temporary storage, protection and transport of existing traffic signal equipment to be salvaged, but all costs in connection therewith shall be included in the Contract unit price bid for the respective item.

Conduit will be paid for separately under Item 804.3. Pullboxes will be paid for separately under Items 811.22 and 811.31.

ITEM 840.101 - A **SUPPORTS FOR OVERHEAD GUIDE SIGN (OD-1) - STEEL** **LUMP SUM**

The work under this item shall conform to the relevant provisions of Section 840 of the Standard Specifications and the following:

~~Under the Base Bid the City of Newton will furnish the supports and design the foundations and the contractor shall install the supports and foundations.~~

Under the Add Alternate Bid the contractor (in additon to the Base Bid scope of work) shall design the foundations and furnish the supports.

Sign supports under this item shall meet the design criteria contained in the AASHTO *Standard Specifications For Structural Supports For Highway Signs, Luminaries and Traffic Signals – 2001 Edition with the 2003 Addenda.* Full span supports shall be designed to sustain a minimum wind speed of 110 mph. The Contractor shall submit two sets of full-scale shop drawing prints and calculations to the Engineer for approval. If corrections are required, one set of the marked-up drawings will be returned to the Contractor for revision and subsequent re-submittal.

Foundations shall be cored pier foundations.

The overhead sign support will support regulatory signs. The completed installation shall be provided with all attachment apputernances necessary for complete attachment and support of the proposed overhead signs.

The contract price shall constitute full compensation for furnishing and installing all materials, labor, equipment tools, appurtenances, and incidentals necessary to satisfactorily complete the item of work, complete, in place and accepted.

ADD ALT – SIGN BRIDGE EXPLORATION LOCATION PLAN & BORING LOGS

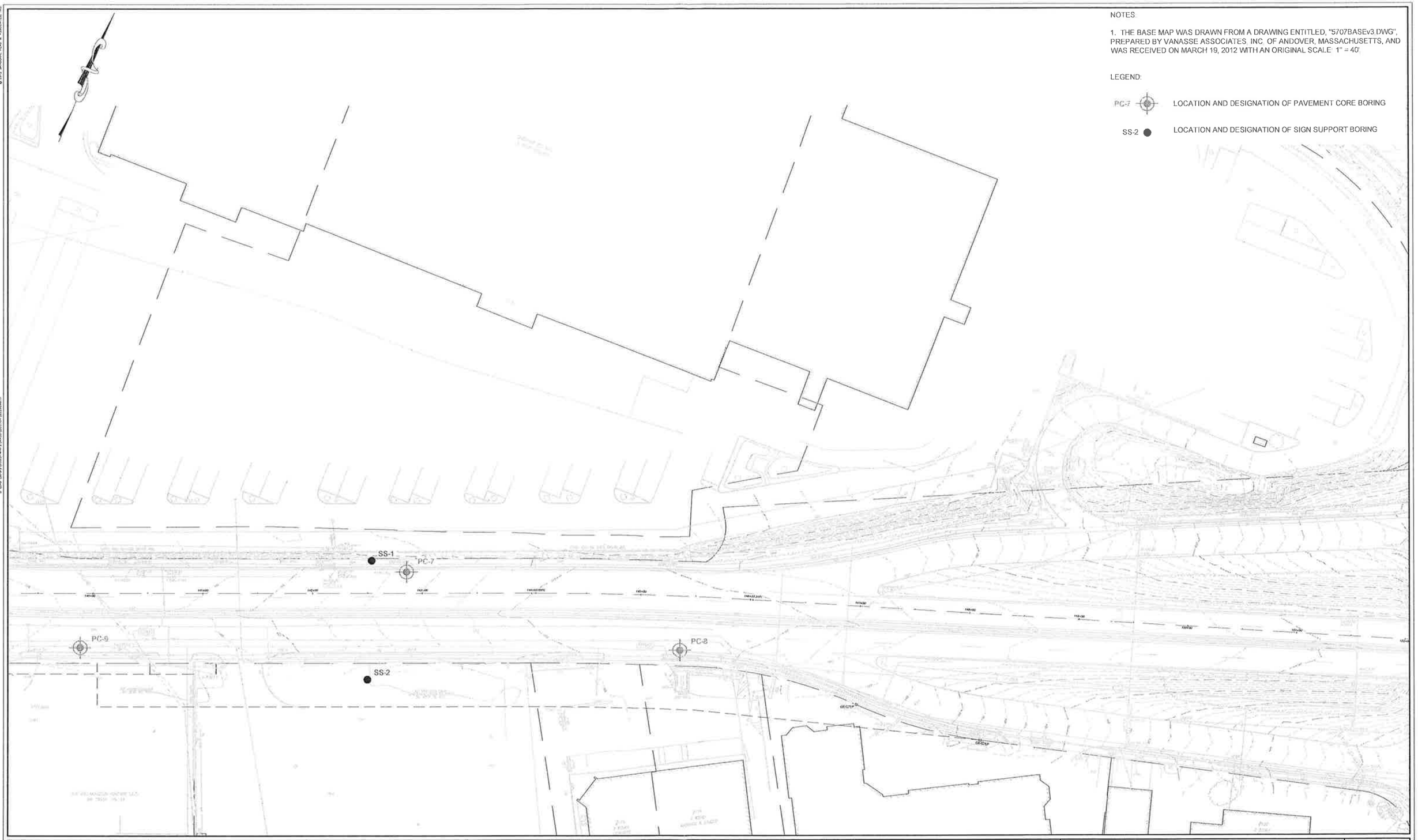
NOTES

1. THE BASE MAP WAS DRAWN FROM A DRAWING ENTITLED, "5707BASEv3.DWG", PREPARED BY VANASSE ASSOCIATES, INC. OF ANDOVER, MASSACHUSETTS, AND WAS RECEIVED ON MARCH 19, 2012 WITH AN ORIGINAL SCALE: 1" = 40'.

LEGEND:

PC-7 — LOCATION AND DESIGNATION OF PAVEMENT CORE BORING

SS-2 — LOCATION AND DESIGNATION OF SIGN SUPPORT BORING



SANBORN HEAD

GRAPHICAL SCALE
0 40 80 120 FT

NO	DATE	DESCRIPTION	BY

DRAWN BY: R.HIRTLE
DESIGNED BY: A.MARTUCCI
REVIEWED BY: V.KOKOSA
PROJECT MGR: B.BETTENCOURT
PIC: V.KOKOSA
DATE: MAY 2012

GEOTECHNICAL DATA REPORT
CHESTNUT HILL SQUARE OFF-SITE ROADWAY IMPROVEMENTS
NEWTON, MASSACHUSETTS

PROJECT NUMBER: 1856.12

EXPLORATION LOCATION PLAN

SHEET NUMBER: 2C

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: CHSq Offsite
Location: Newton, MA
Project No.: 1856.12

Log of Boring SS-1

Ground Elevation: 192 ± feet
Datum: NAVD 1988

Drilling Method: 4¼" OD Casing Drive + Wash

Sampling Method: 2" O.D. Split Spoon/NX Rock Core

Drilling Company: Crawford Drilling Services, LLC
Foreman: D. Green
Date Started: 04/18/12 Date Finished: 04/18/12
Logged By: A. Martucci Checked By: B. Bettencourt

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
04/18/12	—	No Groundwater Encountered		3'	14'	10 Minutes

Depth (ft)	Drill Rate (min/ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0								0'		
		S-1	0.2 - 3.1		---			0.2'	ASPHALT PAVEMENT.	Exploration location excavated with VAC truck and air lance to 2.5 feet for utility clearance. Soil classified on excavation sidewall.
									S-1 (0.2 to 3.1'): Tan/brown, fine to coarse SAND, little to some Gravel, trace Silt. Moist.	
2								SAND & GRAVEL		
		C-1	3.1 - 7		57/22			3.1'	C-1 (3.1 to 7'): Hard, slightly weathered (3-4') to moderate to severely weathered (4-7'), gray, fine to coarse grained, CONGLOMERATE, fractures from vertical to 45 degrees. Moderately to extremely fractured. REC=39%. RQD=16%.	
4	3									
	1									
6	1									
	2									
		C-2	7 - 9.5		30/15				C-2 (7 to 9.5'): Moderately hard, severely weathered, gray, CONGLOMERATE, fractures from vertical to 45 degrees. Extremely fractured. REC=50%. RQD=13%.	
8	1									
	2							BEDROCK		
	1	C-3	9.5 - 12.3		34/19				C-3 (9.5 to 12.3'): Moderately hard, severely weathered, gray, CONGLOMERATE, fractures from vertical to 45 degrees. Extremely fractured. REC=56%. RQD=21%.	
10	2									
	1									
12		C-4	12.3 - 14.3		24/9				C-4 (12.3 to 14.3'): Hard, severely weathered, gray, CONGLOMERATE, fractures from 0 to 90 degrees. Extremely fractured. REC=38%. RQD=0%.	
	1									
	2									
14								14.3'		
	2								Boring terminated at 14.3 feet.	
16										
18										
20										

BORING LOG \\WESSERV1\DATASHARE\DATA\WESDATA\1800\1856.12\WORK\LOGS\1856.12 CORING LOGS.GPJ 2010 SANBORN HEAD V1.GLB 2010 SANBORN HEAD V1.GDT 5/2/12

SANBORN HEAD

Sanborn, Head & Associates, Inc.

Project: CHSq Offsite
Location: Newton, MA
Project No.: 1856.12

Log of Boring SS-2

Ground Elevation: 193 ± feet
Datum: NAVD 1988

Drilling Method: 4¼" OD Casing

Sampling Method: 2" O.D. Split Spoon/NX Rock Core

Drilling Company: Crawford Drilling Services, LLC
Foreman: D. Green
Date Started: 04/17/12 Date Finished: 04/17/12
Logged By: A. Martucci Checked By: B. Bettencourt

Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
04/17/12	---	No Groundwater Encountered		4'	14'	10 Minutes

Depth (ft)	Drill Rate (min/ft)	Sample Information: Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Stratum: Log	Description	Geologic Description	Remarks
0		S-1	0 - 2	9 11 20 20	24/11			0'	S-1 (0 to 2'): Dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
2		S-2	2 - 3.6	10 11 29 60/2"	20/12			SAND & GRAVEL	S-2A (2 to 3'): Dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist. S-2B (3 to 3.6'): Dense, gray, fine to medium SAND and Gravel, little Silt. Moist.	
4		S-3	3.6 - 4.2	34 85/3"	9/5				S-3 (3.6 to 4.2'): Very dense, gray, fine to medium SAND and Gravel, little Silt. Moist.	
	4	C-1	4.2 - 9.2		60/59			4.2'	C-1 (4.2 to 9.2'): Hard, slightly weathered, gray, fine to coarse grained, CONGLOMERATE, fractures from vertical to 60 degrees. Slightly fractured. REC=98%. RQD=75%.	
6	2.5									
	2									
8	1.5									
	2									
	2	C-2	9.2 - 14.2		60/49			BEDROCK	C-2 (9.2 to 14.2'): Hard, slightly weathered, gray, fine to coarse grained, CONGLOMERATE, fractures from vertical to 60 degrees. Moderately fractured. REC=82%. RQD=48%.	
10	2									
	2									
12	1									
	1									
14								14.2'	Boring terminated at 14.2 feet.	
16										
18										
20										

Description and Classification of Soil

1. Density or Consistency: The density or consistency of a soil sample is based on the Standard Penetration Test N-value according to the following table:

Density of Granular Soil	SPT N-Value		Consistency of Cohesive Soil
Very Loose	0-4	<2	Very Soft
Loose	4-10	2-4	Soft
Medium Dense	10-30	4-8	Medium Stiff
Dense	30-50	8-15	Stiff
Very Dense	>50	15-30	Very Stiff
		>30	Hard

The Standard Penetration Resistance, or N-value in blows per foot, is the sum of the blows recorded over the second and third 6-inch interval.

A number followed by "/3" indicates the distance that the sampler advanced. For example "100/4" indicates that 100 blows of a 140 pound hammer falling 30 inches advanced the sampler 4 inches. "WOR/24" indicates the weight of the drilling rods without the hammer caused the sampler to advance 24 inches.

"WOH" indicates the static weight of the 140 pound hammer and the drilling rods attached to the split spoon sampler were sufficient to cause the sampler to advance.

"WOR" indicates the static weight of the drilling rods attached to the split spoon sampler was sufficient to cause the sampler to advance.

2. Color: The color of a soil sample is based on visual observation.

3. Soil Components

A. Description: The components of a soil sample are described by visually estimating the percentage of each component by weight of the total sample using a Modified Burmister System.

i. Major Component: The major soil component is written with upper case letters for granular soil (e.g., SAND, GRAVEL) and a combination of upper and lower case letters for fine grained soil (e.g., Silty CLAY, Clayey SILT).

ii. Minor Component: The minor soil components are written with the first letter of each soil type in upper case, and the remaining letters in lower case (e.g., Gravel, Silt). The minor components are identified and prefaced in the description based on the following percentages:

Preface	Percentage
and	35-50
some	20-35
little	10-20
trace	0-10

iii. Note: The actual percentages of gravel soil may differ from that measured when sampling with a standard split spoon sampler because of the relatively small sampler diameter. Also, it is not possible to identify the presence of boulders and cobbles using a standard split spoon sampler.

B. Definitions

i. Granular Soil: A granular soil sample is defined by the following particle sizes as referenced to a standard sieve:

Material	Description	Standard Sieve Limit	
		Upper	Lower
Boulders	C-sized	--	36 inch
	B-sized	36 inch	24 inch
	A-sized	24 inch	12 inch
Cobbles	--	12 inch	3 inch
Gravel	coarse	3 inch	3/4 inch
	fine	3/4 inch	No. 4
Sand	coarse	No. 4	No. 10
	medium	No. 10	No. 40
	fine	No. 40	No. 200

ii. Fine Grained Soil: The degree of plasticity of fine-grained soils is defined as follows:

Material	Degree of Plasticity	Plasticity Index (PI)	Smallest Thread Diameter (in.)
SILT	Non-Plastic	0	None
Clayey SILT	Slight	1 to 5	1/4
SILT & CLAY	Low	5 to 10	1/8
CLAY & SILT	Medium	10 to 20	1/16
Silty CLAY	High	20 to 40	1/32
CLAY	Very High	40+	1/64

iii. Organic Soil: An organic soil sample is classified by observation of the sample structure as follows:

Material	Description
TOPSOIL	Surficial soils that support plant life and which contain organic matter.
SUBSOIL	Soil underlying the topsoil which may contain very fragments of plant fibers.
PEAT	Deposits of plant remains in which the original plant fibers may be visible.
ORGANIC SILT	Deposit of plant remains in which the original plant fibers have been destroyed, may have high sand content. Usually found underlying peat.

iv. Non-Soil Constituents: Non-soil constituents (artificial or anthropogenic material, organic materials, cobbles and boulders) are described as follows:

The following terminology is used to denote size ranges of non-soil constituents:

Descriptive Term	Size Range	Comparative Term
Specks	< No. 200 Sieve	Silt and Clay fines
Particles	No. 200 Sieve to No. 4 Sieve	Sand
Fragments	No. 4 Sieve to 3 in.	Gravel
Pieces	3 in. to 12 in.	Cobbles
Blocks	> 12 in.	Boulders

The following terminology is used to describe the frequency that a non-soil constituent is observed by estimating the percentage of the constituent by weight of the total sample:

Descriptor	Percentage
very few	0-5
few	5-10
common	10-20
frequent	20-35
numerous	35-50

4. Moisture Content: The moisture content of a soil sample is based on the observable presence of water according to the following table:

Dry	Moisture is not apparent, dusty.
Moist	No visible water.
Wet	Visible free water.

5. Other Pertinent Characteristics: Pertinent characteristics observed in a soil sample should be noted according to the following table:

Soil Structure Produced by Deposition of Sediments	
Stratified	Random soil deposits of varying components of color.
Varved	Alternating soil deposits of varying thickness (i.e., clays or silts).
Stratum	Soil deposit > 12 inches thick.
Layer	Soil deposit 3 inches to 12 inches thick.
Seam	Soil deposit 1/8 inch to 3 inches thick.
Parting/Lens	Soil deposit <1/8 inch thick.

Description and Classification of Bedrock

Rock descriptions indicated on the test boring logs are based on visual-manual observation of the rock core samples obtained. Rock core is generally described and classified as illustrated in the following example:

Hard to Very Hard[1], slightly weathered[2], moderately fractured[3], grey-green[4], fine grained[5], RHYOLITE[6]; with joints[7] spaced 4 to 12" apart and dipping[7] from near horizontal to approximately 60. Open crack[7] in core at 14.4'. REC=94%, RQD = 58%.[8]

1. HARDNESS

VERY HARD:	Cannot be scratched with knife or sharp pick. Breaking of hand specimens requires several hard blows of a geologist's pick.
HARD:	Can be scratched with knife or pick only with difficulty. Hard blow of hammer required to detach hand specimen.
MODERATELY HARD:	Can be scratched with knife or pick. Gauges or grooves to ¼-inch deep can be excavated by hard blow or a geologist's pick. Hand specimens can be detached by moderate blow.
MEDIUM HARD:	Can be grooved or gauged 1/16-inch deep by firm pressure on knife or pick point. Can be excavated in small chips to pieces about 1-inch maximum size by hard blows of the point of a geologist's pick.
SOFT:	Can be gauged or grooved readily with knife of pick point. Can be excavated in chips to pieces several inches in size by moderate blows of a pick point. Small thin pieces can be broken by finger pressure.
VERY SOFT:	Can be carved with knife. Can be excavated readily with point of pick. Pieces 1-inch or more in thickness can be broken with finger pressure. Can be scratched readily by fingernail. Can often be indented with moderate finger pressure.

2. WEATHERING CHARACTERISTICS:

COMPLETELY WEATHERED:	Rock reduced to soil. Rock "fabric" not discernible or discernible only in small, scattered locations. Quartz may be present as dikes or stringers.
VERY SEVERELY WEATHERED:	All rock except quartz discolored or stained. Rock "fabric" discernible, but mass effectively reduced to "soil" with only fragments of strong rock remaining.
SEVERELY WEATHERED:	All rock except quartz discolored or stained. Rock "fabric" clear and evident, but reduced in strength to strong soil. Some fragments of strong rock are usually left.
MODERATELY WEATHERED:	Significant portions of rock show discoloration and weathering effects. Rock has a dull sound under hammer and shows significant loss of strength as compared with fresh rock.
SLIGHTLY WEATHERED:	Rock generally fresh, joints stained and discoloration extends into rock up to 1 inch. Joints may contain clay.
VERY SLIGHTLY WEATHERED:	Rock generally fresh, joints stained, some joints may show thin clay coatings.
FRESH:	Rock fresh, crystals, bright, few joints may show slight staining. Rock rings under hammer if crystalline.

3. ROCK CONTINUITY

Any fracture in rock other than bedding plane partings.

EXTREMELY FRACTURED:	Drill core stem less than 1 inch
MODERATELY FRACTURED:	Drill core stem 1 inch to 4 inches
SLIGHTLY FRACTURED:	Drill core stem 4 inches to 8 inches
SOUND:	Drill core stem greater than 8 inches

4. COLOR: VISUAL PERCEPTION.

5. TEXTURE

The description of the average or predominant mineralogic grain size diameter of igneous and metamorphic rocks and the constituent grain size diameter of sedimentary and metasedimentary rocks.

VERY FINE-GRAINED:	Too small to be seen with the unaided eye
FINE-GRAINED:	Visible with unaided eye to 1/16 inch diameter
MEDIUM-GRAINED:	1/16 inch to ¼ inch diameter
COARSE-GRAINED:	Greater than ¼ inch

6. ROCK TYPE

The geologic name for a rock processing a specific set of lithologic, compositional, and/or textured characteristics.

7. ROCK STRUCTURE

BEDDING:	Compositional and textural layering in sedimentary rocks, the term may be used with caution to describe layering in metamorphic and/or volcanic rocks (flow banding).
FOLIATION:	Any planar fabric homogeneously distributed throughout the rock mass at the scale of observation. Bedding is foliation (primary). Most foliation in rock is secondary. Joints and/or fractures usually are not foliation.
PARTING:	A plane or surface along which a rock is readily separated or is naturally divided into layers.
FRACTURE:	Any break in a rock, whether or not it is associated with displacement, due to mechanical failure by stress.
CRACK:	A partial or incomplete fracture.
JOINT:	A planar or near planar fracture occurring without displacement parallel to the fracture surfaces.
SHEAR:	A fracture occurring with minor displacement parallel to the adjacent fracture surfaces.
FAULT:	A fracture occurring with significant movement parallel to the adjacent fracture surfaces.
FAULT/SHEAR ZONE:	A zone containing numerous faults or shears.

Bedding Thickness and Joint Spacing

Bedding	Joints	Perpendicular Distance
Very Thin	Very Close	Less than 2 inches
Thin	Close	2 inches to 1 foot
Medium	Moderately Close	1 foot to 3 feet
Thick	Wide	3 feet to 10 feet
Massive	Very Wide	More than 10 feet

Bedding / Joint Angle

Description	Angle
Horizontal	0° to 5°
Shallow or Low Angle	5° to 35°
Moderately Dipping	35° to 55°
Steep or High Angle	55° to 85°
Vertical	85° to 90°

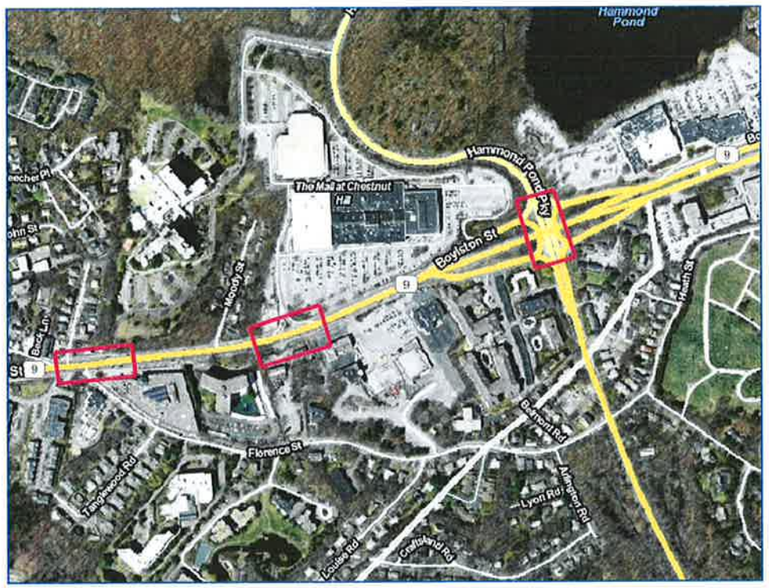
8. ROCK QUALITY DESIGNATION (RQD)

A relative indication of the frequency of naturally occurring fractures observed along a specified length of rock core. RQD values are determined only for rock core 2 inches (N) in diameter. RQD is defined as the sum in inches of all pieces of rock core 4 inches or greater in length, divided by the length in inches of the core run. If the core is broken by handling or drilling procedures, the pieces are fitted together and counted as one piece, provided they constitute the required 4-inch length. Where the recovery for a core run is greater than 100 percent, RQD values are adjusted to account for the portion of the core left in the hole from the previous run. The length of the core sections is determined by measuring down the centerline of the core.

SUBSURFACE UTILITY INVESTIGATION

SUBSURFACE UTILITY ENGINEERING PLAN
CHESTNUT HILL UTILITY INVESTIGATION
CHESTNUT HILL, MA

PREPARED FOR
VANASSE & ASSOCIATES
10 NEW ENGLAND BUSINESS CENTER DRIVE - SUITE 314
ANDOVER, MA 01810



LOCUS PLAN
NOT TO SCALE

INDEX OF SHEETS	SHEET NO.
COVER - C1	1
LEGEND & NOTES - L1	2
SUE PLAN	3
SUE PLAN	4
SUE PLAN	5
SUE PLAN	6

BSI ENGINEERING, INC.
100 HALLET STREET, BOSTON, MA 02124
617 265 4200

April 20, 2012

REV. NO.	DATE	DESCRIPTION	MADE BY	CHK BY	APPD. BY

BSI Engineering, Inc.
100 Hallet Street Boston, MA 02124
Telephone (617) 265 4200 Fax (617) 209 1297 www.bsieng.com

SUBSURFACE UTILITY ENGINEERING
CHESTNUT HILL UTILITY INVESTIGATION
CHETNUT HILL, MA

PREPARED FOR
VANASSE & ASSOCIATES, INC.
10 NEW ENGLAND BUSINESS CENTER DRIVE
ANDOVER, MA 01810

OWNER: MASS DOT		
BSIE PLAN NO.: 12-2616	FILE: 12-2616UTL01 (EMAIL 6-20-12).DWG	
SUE BY: SBG, BAL, IMS	DRAWN BY: IMS	CHKD.: BAL
APPROVED: JFN	DATE: 4/20/2012	SCALE: NTS
CONTRACT NO.: 12-2616	SHEET NO.: 1 OF 6	

BSIE LEGENED

QUALITY LEVEL "A" INFORMATION

VACUUM EXCAVATION DATA POINT QL-A

QUALITY LEVEL "B" INFORMATION

- E QL-B — ELECTRICAL QL-B
- FA QL-B — FIRE ALARM QL-B
- S QL-B — SEWER QL-B
- T QL-B — TELECOMMUNICATIONS QL-B
- TR QL-B — TRAFFIC QL-B
- W QL-B — WATER QL-B

QUALITY LEVEL "C" INFORMATION

- E QL-C — ELECTRICAL QL-C
- FA QL-C — FIRE ALARM QL-C
- S QL-C — SEWER QL-C
- T QL-C — TELECOMMUNICATIONS QL-C
- TR QL-C — TRAFFIC QL-C
- W QL-C — WATER QL-C
- OHE-T-TV(C) — OVERHEAD ELECTRIC - TELEPHONE - CABLE
- OHE-T(C) — OVERHEAD ELECTRIC - TELEPHONE
- OHE-TV(C) — OVERHEAD ELECTRIC - CABLE
- OHE(C) — OVERHEAD ELECTRIC
- OHT-TV(C) — OVERHEAD TELEPHONE - CABLE
- OHT(C) — OVERHEAD TELEPHONE

QUALITY LEVEL "D" INFORMATION

- E QL-D — ELECTRICAL QL-D
- FA QL-D — FIRE ALARM QL-D
- S QL-D — SEWER QL-D
- T QL-D — TELECOMMUNICATIONS QL-D
- TR QL-D — TRAFFIC QL-D
- W QL-D — WATER QL-D

LAND BASE

- EXISTING BUILDINGS & RELATED STRUCTURES
- BRIDGE ABUTMENTS

SUE PLAN NOMENCLATURE

- OR EOI — END OF INFORMATION
- (R) — RECORD INFORMATION
- QL-X|QL-X — CHANGE IN QUALITY LEVEL
- SUE PROJECT LIMITS

BSIE SYMBOLS LEGEND (QL-C) INFORMATION

CABLE TV FACILITIES
- CABLE HAND HOLE
- CABLE MANHOLE

DRAIN FACILITIES
- CATCH BASIN
- CATCH BASIN ROUND
- CATCH BASIN D-GRATE
- DRAIN LAMP HOLE
- DROP INLET
- DRAIN MANHOLE
- DRAIN LEACHING BASIN

ELECTRICAL FACILITIES
- ELECTRICAL HAND HOLE
- ELECTRICAL METER PIT
- ELECTRICAL CONTROL BOX
- ELECTRICAL MANHOLE
- GUIDE ANCHOR
- MBTA MANHOLE
- ELECTRICAL PTC TEST BOX
- UTILITY POLE NO LIGHTS
- LIGHT POLE NO UTILITIES
- UTILITY LIGHT POLE

FIRE FACILITIES
- FIRE PULL BOX
- FIRE MANHOLE

GAS & STEAM FACILITIES
- GAS DIVISION GATE
- GAS GATE CIRCULAR
- GAS GATE SERVICE PIPE
- GAS METER PIT
- GAS REGULATOR PIT
- GAS SACRIFICIAL ANODE
- GAS TEST BOX
- GAS VENT
- GAS DRIP
- GAS GATE SQUARE
- STEAM REGULATOR PIT
- STEAM MANHOLE
- STEAM VALVE

POLICE DEPARTMENT FACILITIES
- POLICE PULL BOX

SEWER FACILITIES
- COMBINED SEWER LAMP HOLE
- COMBINED SEWER MANHOLE
- SEWER MANHOLE
- SEWER LAMP HOLE
- SEWER VENT

TELEPHONE & TRAFFIC FACILITIES
- TELEPHONE HAND HOLE
- TELEPHONE MANHOLE
- TELEPHONE CABINET
- TELEPHONE BOOTH
- TRAFFIC LOOP DETECTOR
- TRAFFIC CONTROL BOX
- TRAFFIC HAND HOLE
- TRAFFIC SIGNAL POLE

UNKNOWN FACILITIES
- UNKNOWN GATE VALVE
- MANHOLE UNKNOWN

WATER FACILITIES
- AIR COCK
- BUTTERFLY VALVE
- WATER CHECK VALVE
- FIRE HYDRANT
- LOWRY HYDRANT
- WATER METER PIT
- WATER PITOMETER
- WATER POST INDICATOR VALVE
- WATER STAND PIPE
- WATER DIVISION GATE
- WATER GATE
- WATER GATE FIRE PIPE
- WATER GATE SERVICE PIPE
- WATER SACRIFICAL ANODE
- WATER TEST BOX
- WATER VENT
- WATER MANHOLE
- BUTTERFLY VALVE CHAMBER

LAND BASE FACILITIES
- BOLLARD
- SOIL BORING
- COAL HOLE
- USPS MAIL BOX
- OBSERVATION WELL
- PARKING METER
- SHRUB
- SIGN
- TREE

SURVEY CONTROL
- BENCH MARK
- STONE BOUND
- CAT CONTROL POINT
- CROSS CUT
- DRILL HOLE
- IRON PIPE
- LEAD PLUG W/ BRASS TAC
- MASS. GEODETIC DISK
- PARKER KALON NAIL

Subsurface Utility Engineering Notes:

1. This plan was prepared in conformance with American Society of Civil Engineer standard CI/ASCE 38-02 "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data".
2. BSIE will only warrant the existence or nonexistence of utility lines based on quality level A information. QL "A" information is only valid within the visible limits of the test hole.
3. BSIE will advance a vacuum test hole until a condition of practical refusal for vacuum excavation is reached. Practical refusal is defined as any of the following conditions occurring: Encountering a utility, bedrock, water table, rocks/cobbles, condition of hole instability or reaching a depth of 8'.
4. Below ground structures, unless dimensioned, are symbolic only.
5. Prior to excavation utility owners shall review and approve this drawing.
6. This drawing is prepared in color. Reproduction may alter the information contained hear in. BSIE does not warrant the information contained hear in following reproduction.
7. Use or reuse of this drawing by parties not directly contracted with BSIE is prohibited without prior written permission.
8. Base mapping/survey control is shown for information only and is not warranted by BSIE.
9. BSIE recommends that all existing utilities near proposed construction activities be located by vacuum excavation (quality level A) prior to any excavation (if not already located by vacuum excavation).

Utility Quality Level Information Index (see ASCE/CI 38-02):

QUALITY LEVEL D: "QL D". Utility information plotted on the drawing based solely on record information, individual recollections or the existence of utility service. It shall be noted that all information shown (other than at test hole locations, see QL A below), include but not limited to a utilities size, capacity, material composition; condition or service status shall be considered QL D even though the utility may be plotted and labeled as QL C or QL B.

QUALITY LEVEL C: "QL C". Utility information obtained as above for quality level D, plotted to correlate with surface utility features which have been field verified, survey located and accurately reduced onto the design/construction documents. Included in this category aerial utility information and utility depiction's, which in the professional opinion of the subsurface utility engineer, represent the most probable approximate horizontal location, type and/or existence of a utility.

QUALITY LEVEL B: "QL B". Utility information derived by establishing the approximate surface horizontal location of a utility using electronic methods. Said information is subsequently field survey located and accurately reduced onto the design/construction documents.

QUALITY LEVEL A: "QL A". Utility information which has been visually verified, survey located (both horizontally and vertically) and accurately reduced onto the design/construction documents. This is typically shown as test hole or other dimensioned information.

SUE General Notes:

1. Certain utilities shown have been traced on the ground using electronic designation techniques. Designation, or electronic utility location, is defined as the surface location of a utility line based on electronic geophysical prospecting techniques and is approximate in relation to the actual location of the possible utility.
2. Certain utilities shown have been taken from available record information. These utilities may not have been verified. (See Note #4 below.)
3. All existing designated utilities near proposed construction should be exactly located using Non-Destructive Air-Vacuum Excavation, if not already located by Air-Vacuum Excavation (See Quality Level A above).
4. Unless Non-Destructive Air-Vacuum Excavation is utilized at a particular location, BSIE does not guarantee the existence or non-existance of utility lines
5. At locations, where BSIE is directed to perform Non-Destructive Air-Vacuum Excavation, the test hole is advanced until a condition of practical refusal for Air-Vacuum Excavation is reached or hole is advanced to a depth of 8.0' (eight feet). Practical refusal being defined as encountering a utility, bedrock, water table, large rocks/ cobbles, suspected hazardous materials or a condition of hole instability.
6. Where BSIE is directed to perform Non-Destructive Air-Vacuum Excavation to confirm the non-existance of utilities, BSIE will only report non-existance of utilities within the visible limits of the excavation. BSIE is not responsible for ensuring that work by others is performed at the same location as the Air-Vacuum Excavation Hole.
7. Below ground structures unless otherwise depicted are symbolic only.
8. Prior to any excavating, BSIE recommends that all utility owners should review this drawing for accuracy and completeness.

General Project Notes:

1. Mapping provided by:
   Company Name
   Address
   Address

2. Horizontal and vertical survey control provided by:
   Company Name
   Address
   Address

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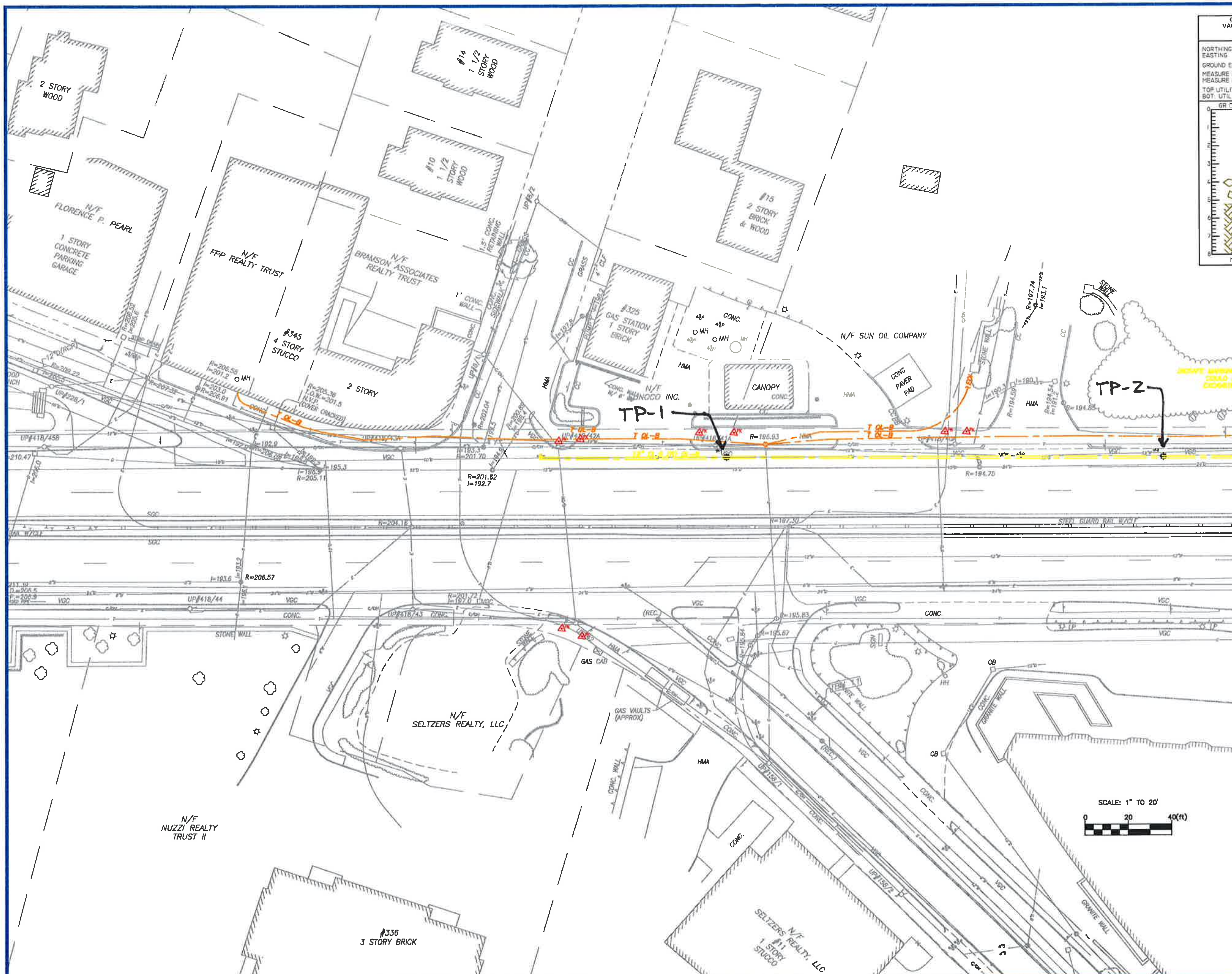
BSI Engineering, Inc.
100 Hallet Street Boston, MA 02124
Telephone (617) 265 4200 Fax (617) 209 1297 www.bsieng.com

SUBSURFACE UTILITY ENGINEERING

CHESTNUT HILL UTILITY INVESTIGATION
CHETNUT HILL, MA

PREPARED FOR
VANASSE & ASSOCIATES, INC.
10 NEW ENGLAND BUSINESS CENTER DRIVE
ANDOVER, MA 01810

OWNER: MASS DOT		
BSIE PLAN NO.: 12-2616	FILE: 12-2616UTL01 (EMAIL 6-20-12).DWG	
SUE BY: SBG, BAL, IMS	DRAWN BY: IMS	CHKD.: BAL
APPROVED: JFN	DATE: 4/20/2012	SCALE: NTS
CONTRACT NO.: 12-2616	SHEET NO.: 2 OF 6	



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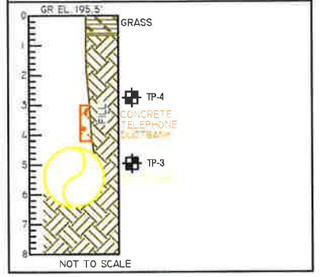
SUE BY: SBG, BAL, IMS	DRAWN BY: IMS / CHKD.: BAL
APPROVED: JFN	DATE: 6/12/12 / SCALE: 1"=20'
CONTRACT NO.: 12-2616	SHEET NO.: 3 OF 6

QUALITY LEVEL A VACUUM EXCAVATION	TP-3	TP-4
NORTHING	2941612.0	2941613.3
EASTING	743285.4	743287.3
GROUND EL.	195.5'	195.5'
MEASURE DOWN TOP	-4.4'	-3.0'
MEASURE DOWN BOT.	N/A	-4.2'
TOP UTILITY EL.	191.1'	192.5'
BOT. UTILITY EL.	N/A	191.3'



TP-4

TP-3

TELEPHONE-DUCTBANK FOUND WITH 24" GAS

#419 1 1/2 STORY WOOD

#415 1 1/2 STORY WOOD

#261 2 STORY WOOD

#280 10 STORY BRICK

#232 2 STORY BRICK

#250 2 1/2 STORY BRICK

3 STORY BRICK

ENCLOSED

CANOPY OVER

STONE WALL

OVERHANG 19.5± BH

FIRE ESCAPE

N/F DAVID G. WALKER TRUSTEE OF DACOS NOMINEE TRUST BK. 10387, PG. 394

TBM9

TBM1

SCALE: 1" TO 20'

0 20 40(ft)

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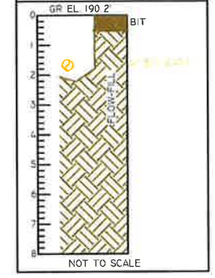
SUE BY: SBG, BAL, IMS	DRAWN BY: IMS	CHKD.: BAL	
APPROVED: JFN	DATE: 6/13/2012	SCALE: 1"=20'	
CONTRACT NO.: 12-2616	SHEET NO.: 4 OF 6		

QUALITY LEVEL A
VACUUM EXCAVATION
TP-5

NORTHING	2941973.9
EASTING	744232.4
GROUND EL.	190.2'
MEASURE DOWN TOP	-1.5'
MEASURE DOWN BOT.	N/A
TOP UTILITY EL.	188.7'
BOT. UTILITY EL.	N/A



TP-5

SCALE: 1" TO 20'
0 20 40(ft)

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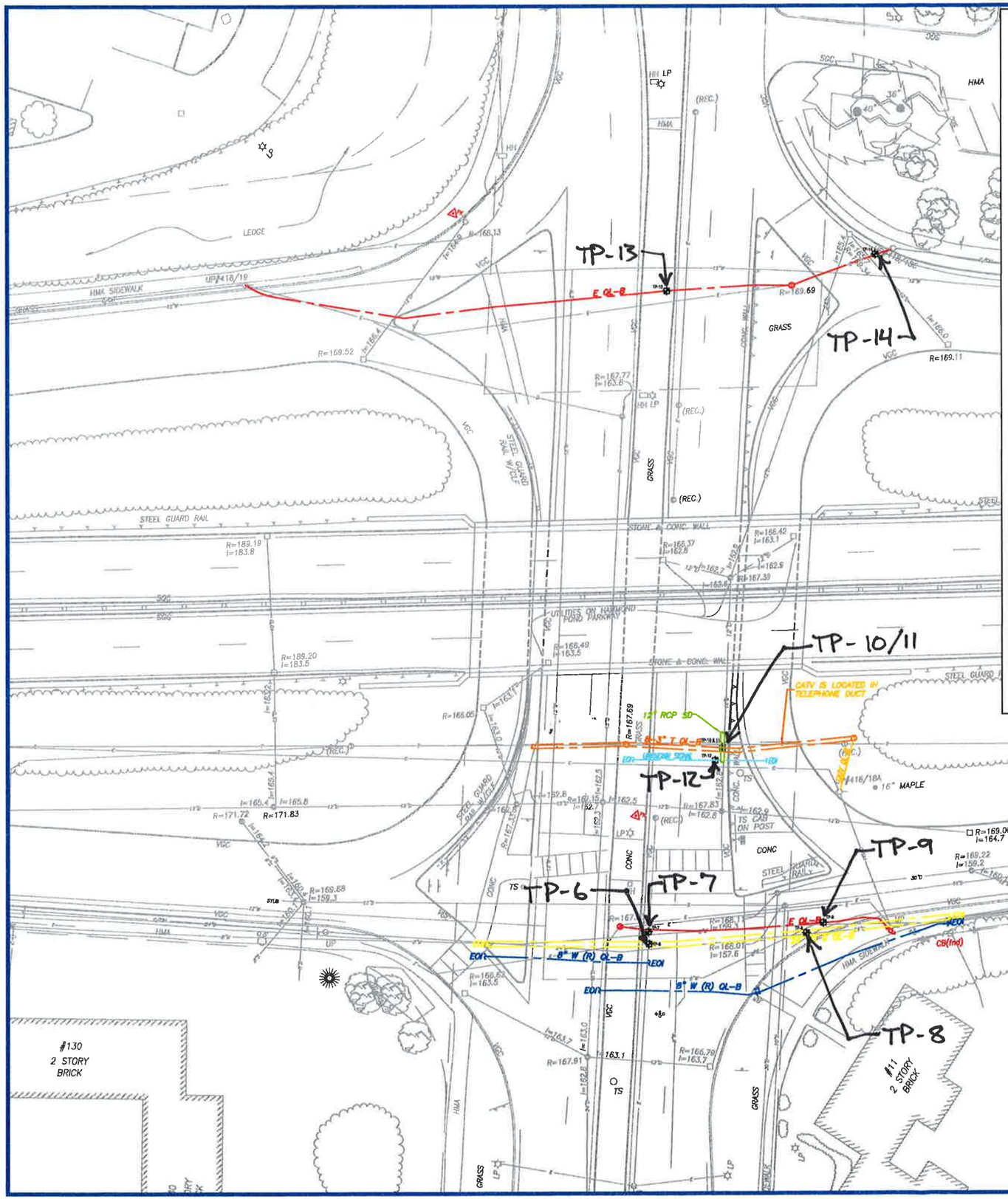
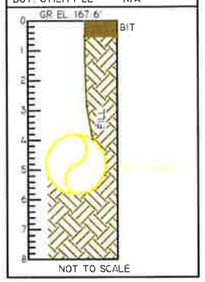
SUE BY: SBG, BAL, IMS	DRAWN BY: IMS	CHKD.: BAL
APPROVED: JFN	DATE: 6/13/2012	SCALE: 1"=20'
CONTRACT NO.: 12-2616	SHEET NO.: 5 OF 6	



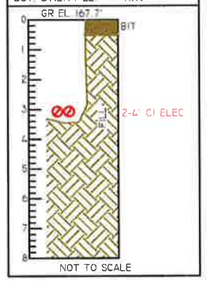
QUALITY LEVEL A VACUUM EXCAVATION — TP-6

NORTHING	2942116.4
EASTING	744805.8
GROUND EL.	167.6'
MEASURE DOWN TOP	-3.8'
MEASURE DOWN BOT	N/A
TOP UTILITY EL.	163.8'
BOT. UTILITY EL.	N/A



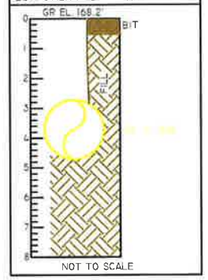
QUALITY LEVEL A VACUUM EXCAVATION — TP-7

NORTHING	2942120.7
EASTING	744803.9
GROUND EL.	167.7'
MEASURE DOWN TOP	-2.9'
MEASURE DOWN BOT	N/A
TOP UTILITY EL.	164.8'
BOT. UTILITY EL.	N/A



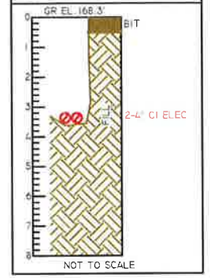
QUALITY LEVEL A VACUUM EXCAVATION — TP-8

NORTHING	2942140.3
EASTING	744860.3
GROUND EL.	168.2'
MEASURE DOWN TOP	-2.7'
MEASURE DOWN BOT	N/A
TOP UTILITY EL.	165.5'
BOT. UTILITY EL.	N/A



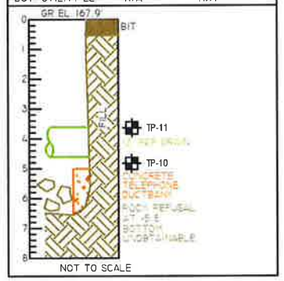
QUALITY LEVEL A VACUUM EXCAVATION — TP-9

NORTHING	2942146.0
EASTING	744865.0
GROUND EL.	168.3'
MEASURE DOWN TOP	-3.2'
MEASURE DOWN BOT	N/A
TOP UTILITY EL.	165.1'
BOT. UTILITY EL.	N/A



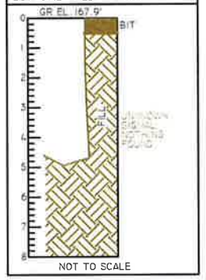
QUALITY LEVEL A VACUUM EXCAVATION — TP-10 / TP-11

	TP-10	TP-11
NORTHING	2942195.7	2942195.7
EASTING	744807.2	744807.2
GROUND EL.	167.9'	167.9'
MEASURE DOWN TOP	-5.0'	-3.6'
MEASURE DOWN BOT	N/A	N/A
TOP UTILITY EL.	162.9'	164.3'
BOT. UTILITY EL.	N/A	N/A



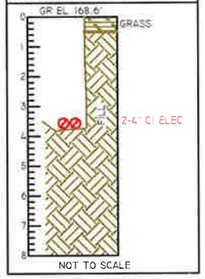
QUALITY LEVEL A VACUUM EXCAVATION — TP-12

NORTHING	2942190.4
EASTING	744806.1
GROUND EL.	167.9'
MEASURE DOWN TOP	N/A
MEASURE DOWN BOT	N/A
TOP UTILITY EL.	N/A
BOT. UTILITY EL.	N/A



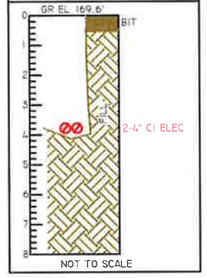
QUALITY LEVEL A VACUUM EXCAVATION — TP-13

NORTHING	2942351.8
EASTING	744729.7
GROUND EL.	168.6'
MEASURE DOWN TOP	-3.5'
MEASURE DOWN BOT	N/A
TOP UTILITY EL.	165.1'
BOT. UTILITY EL.	N/A



QUALITY LEVEL A VACUUM EXCAVATION — TP-14

NORTHING	2942391.2
EASTING	744799.3
GROUND EL.	169.6'
MEASURE DOWN TOP	-3.7'
MEASURE DOWN BOT	N/A
TOP UTILITY EL.	165.9'
BOT. UTILITY EL.	N/A



REV. NO.	DATE	DESCRIPTION	MADE BY	CHK. BY	APPD. BY

BSI Engineering, Inc.
100 Hallet Street Boston, MA 02124
Telephone (617) 265 4200 Fax (617) 209 1297 www.bsieng.com

SUBSURFACE UTILITY ENGINEERING

CHESTNUT HILL UTILITY INVESTIGATION
CHETNUT HILL, MA

PREPARED FOR
VANASSE & ASSOCIATES, INC.
10 NEW ENGLAND BUSINESS CENTER DRIVE
ANDOVER, MA 01810

OWNER:	MASS DOT	
BSIE PLAN NO.: 12-2616	FILE: 12-2616UTL01 (EMAIL 6-20-12).DWG	
SUE BY: SBG, BAL, IMS	DRAWN BY: IMS	CHKD.: BAL
APPROVED: JFN	DATE: 4/20/2012	SCALE: 1"=20'
CONTRACT NO.: 12-2616	SHEET NO.: 6 OF 6	

SUGGESTED CONSTRUCTION PHASING –
THE MALL AT CHESTNUT HILL EAST DRIVEWAY

PHASE 1

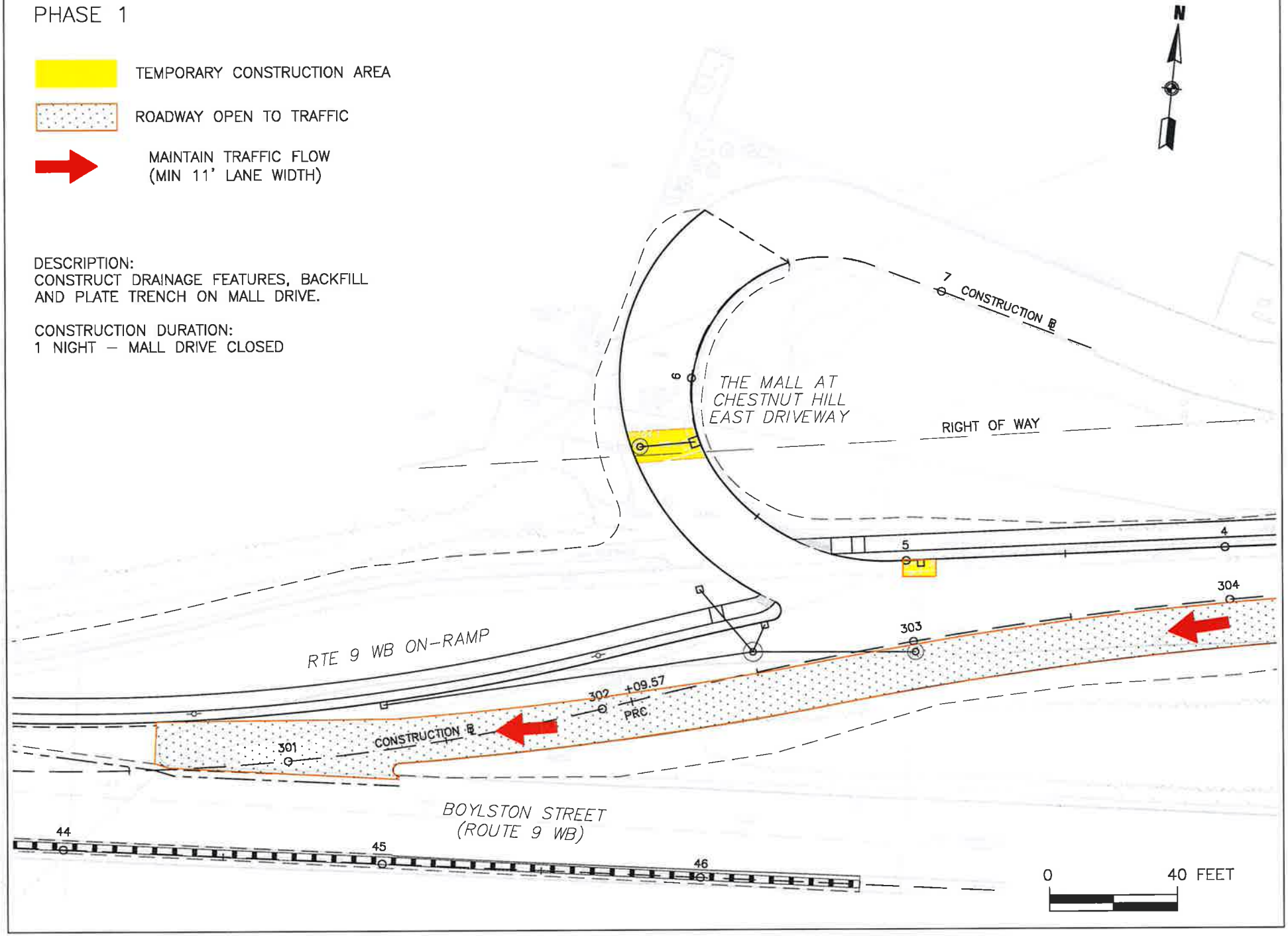
TEMPORARY CONSTRUCTION AREA

ROADWAY OPEN TO TRAFFIC

MAINTAIN TRAFFIC FLOW
(MIN 11' LANE WIDTH)

DESCRIPTION:
CONSTRUCT DRAINAGE FEATURES, BACKFILL AND PLATE TRENCH ON MALL DRIVE.

CONSTRUCTION DURATION:
1 NIGHT – MALL DRIVE CLOSED



PHASE 2

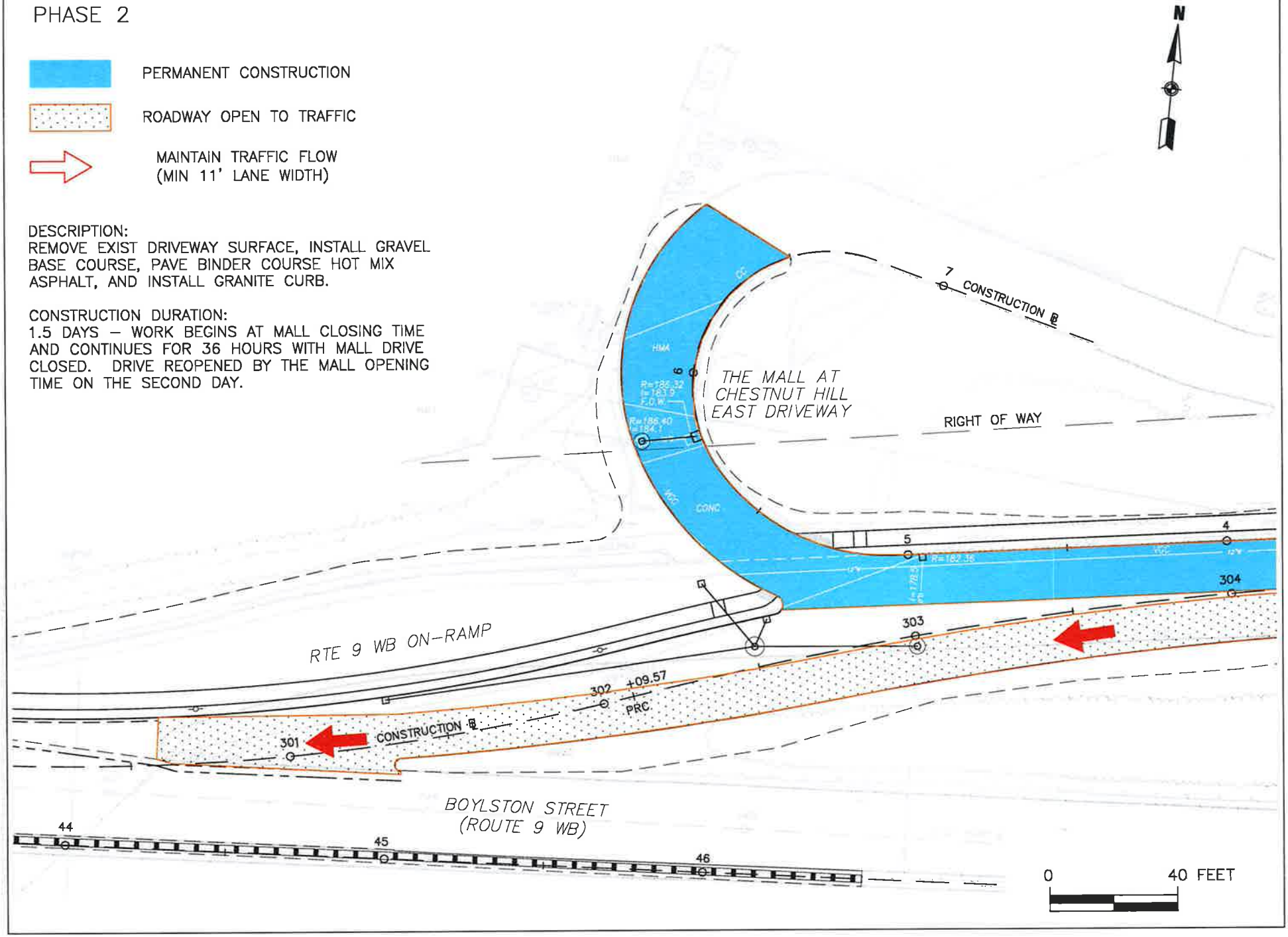
PERMANENT CONSTRUCTION

ROADWAY OPEN TO TRAFFIC

MAINTAIN TRAFFIC FLOW
(MIN 11' LANE WIDTH)

DESCRIPTION:
REMOVE EXIST DRIVEWAY SURFACE, INSTALL GRAVEL BASE COURSE, PAVE BINDER COURSE HOT MIX ASPHALT, AND INSTALL GRANITE CURB.

CONSTRUCTION DURATION:
1.5 DAYS – WORK BEGINS AT MALL CLOSING TIME AND CONTINUES FOR 36 HOURS WITH MALL DRIVE CLOSED. DRIVE REOPENED BY THE MALL OPENING TIME ON THE SECOND DAY.



PHASE 3

WORK STAGING AREA

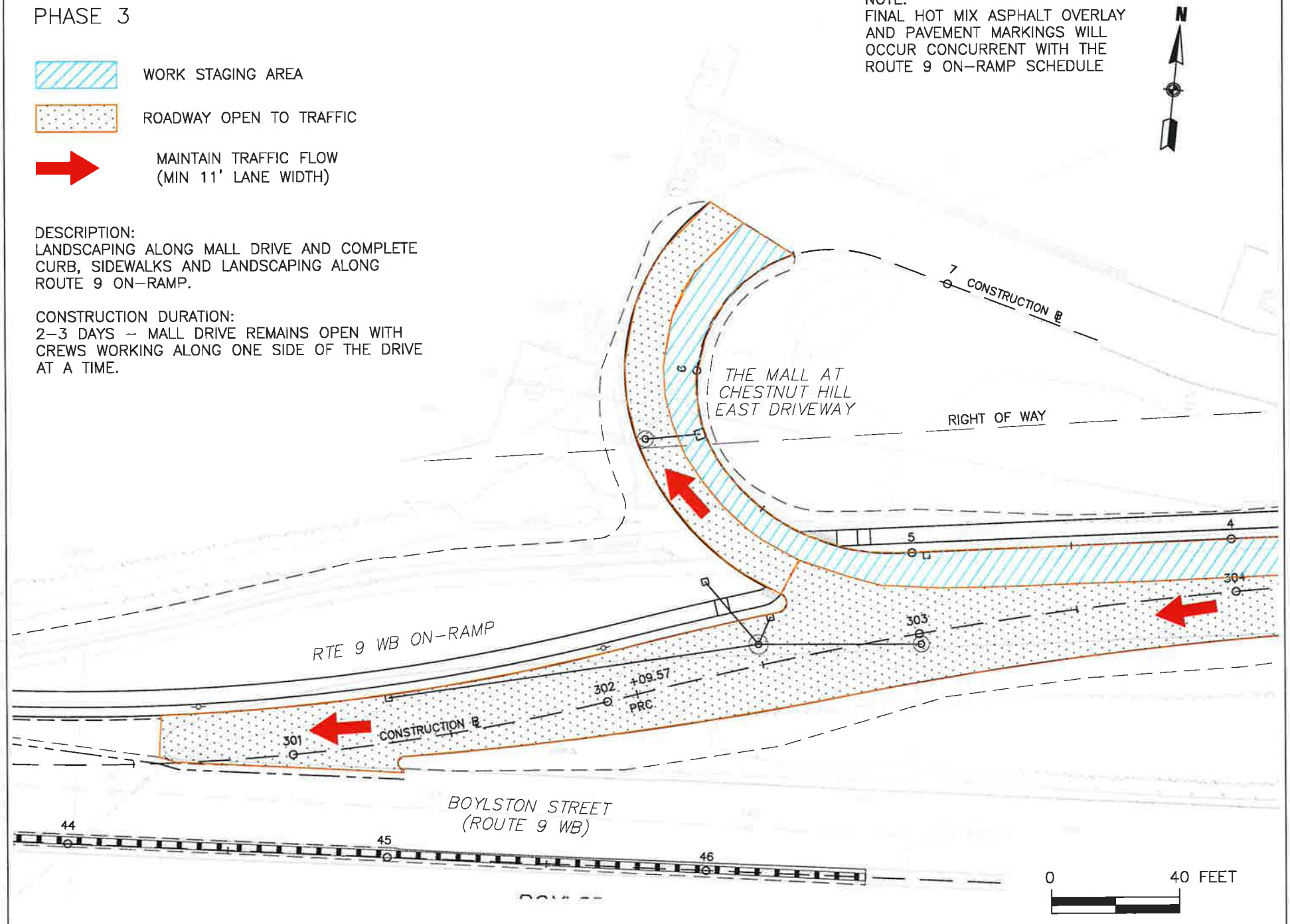
ROADWAY OPEN TO TRAFFIC

MAINTAIN TRAFFIC FLOW
(MIN 11' LANE WIDTH)

DESCRIPTION:
LANDSCAPING ALONG MALL DRIVE AND COMPLETE CURB, SIDEWALKS AND LANDSCAPING ALONG ROUTE 9 ON–RAMP.

CONSTRUCTION DURATION:
2–3 DAYS – MALL DRIVE REMAINS OPEN WITH CREWS WORKING ALONG ONE SIDE OF THE DRIVE AT A TIME.

NOTE:
FINAL HOT MIX ASPHALT OVERLAY AND PAVEMENT MARKINGS WILL OCCUR CONCURRENT WITH THE ROUTE 9 ON–RAMP SCHEDULE



NSTAR WORK ORDER APPLICATION

NSTAR Electric - Work Order Application

for Dave Amann

Customer Request In-Service Date: _____ ***NSTAR WO Received Date:*** _____

Service Address: Street: _____ Suite: _____ Town: _____ Zip: _____

Customer Of Record:

Customer Responsible for Payment of Monthly Electric Bills

Name to appear on Monthly Bill: _____

DBA – C/O Name: _____

Billing Address: _____

Telephone: _____ Tax ID Number: _____

Existing Account or Meter Number (if applicable): _____

Property Owner Name (if different from above): _____

Owner Address: _____

Owner Phone Number: _____

Party Responsible for Construction costs associated with work order (if different from above)

Name: _____

Address: _____

Phone Number: _____

Please Note that Articles of Incorporation are required for new commercial NSTAR Customers

Type of Service Requested: (Circle Appropriate)

New Service | Service Upgrade | Service Relocation | Temporary Service

Pole Relocation | Disconnect/Reconnect | Service Removal | Metering Only

OH Service from Pole, Pole# : _____ UG Service from; Riser-Pole # : _____ Padmount # : _____

Customer Loading

Type of Load	New Connected Load in KVA	
	Single Phase	*Three Phase*
Lighting		
Electric heat		
Air Conditioning		
Refrigeration		
Cooking		
Electric Dryer		
Water Heater		
Computer		
Process Equip.		
Motors/Elevators		
Miscellaneous		
Totals		

Brief Description of Work

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Number of Meters Required:

Residential: _____ Commercial: _____ Public: _____

Main Switch Voltage: _____ Amperage: _____ Phase: _____

Service Voltage: _____ Amperage: _____ Phase: _____

Facility Type (ie: school, hospital): _____ New Building Square Feet: _____

If more than 1 meter is required, how will meters be labeled? (ie: Unit 1, 2, etc, Unit A, B, etc.)

_____

_____

Please fill out attached M-13 form for meter designation.

Additional Equipment:

Generator: KW: _____ Phase: _____ Purpose: _____

Motor(S) : Total # : _____ Largest HP: _____ Phase: _____ Locked Rotor AMP: _____

Type of Starting Compensation (choose one): Hard Soft Capacitor VFD

*See Article 802 of NSTAR Information and Requirements Book for Maximum LR current and Three Phase Protection *

Contact Name (circle appropriate):

Customer/Contractor/Consultant: _____
Street Address: _____
City, State, Zip: _____
Telephone: _____ Best Time to Call: _____
Pager: _____ Fax: _____
Cell: _____

Electrician: _____ License Number: _____
Business Name: _____
Street Address: _____
City, State, Zip: _____
Telephone: _____ Best Time to Call: _____
Pager: _____ Fax: _____
Cell: _____

Please note that by Interconnecting with NSTAR's Distribution System the Customer of Record acknowledges that they have reviewed and are in compliance with the NSTAR Information & Requirements for Electric Service (Red Book).

For **New Commercial Services, New Residential Developments, New 13.8 kv Two Line Station Electric Service**, please provide (2) copies of City/Town approved site plans that illustrates the new facility location and the proposed location of the new utilities (electric, gas, water, sewer, telecommunications) and a One-Line Diagram.

For **Service Increases** at existing facilities, please submit a One-Line Diagram if available.

For **New Residential Services where a pole must be set**, please provide (2) copies of a site plan that illustrates the proposed location of the new facilities.

For **Temporary Service Requests**, please provide (2) copies of a site plan illustrating service location.

You may **Fax** this Form or mail any additional correspondence to:

Mr. David Amann, SW 340
NSTAR Electric and Gas
1 NSTAR Way
Westwood, MA, 02090
Tel: (781) 441 – 8123
Fax: (781) 441-3194
David.amann@nstar.com

FOR NSTAR USE ONLY

NSTAR Revenue Allowance: _____ NSTAR Rate: _____

KVA or KW rating of Existing Loads (if applicable):

Existing Winter Peak Demand: _____ Month/Date/Year: _____
Existing Summer Peak Demand: _____ Month/Date/Year: _____

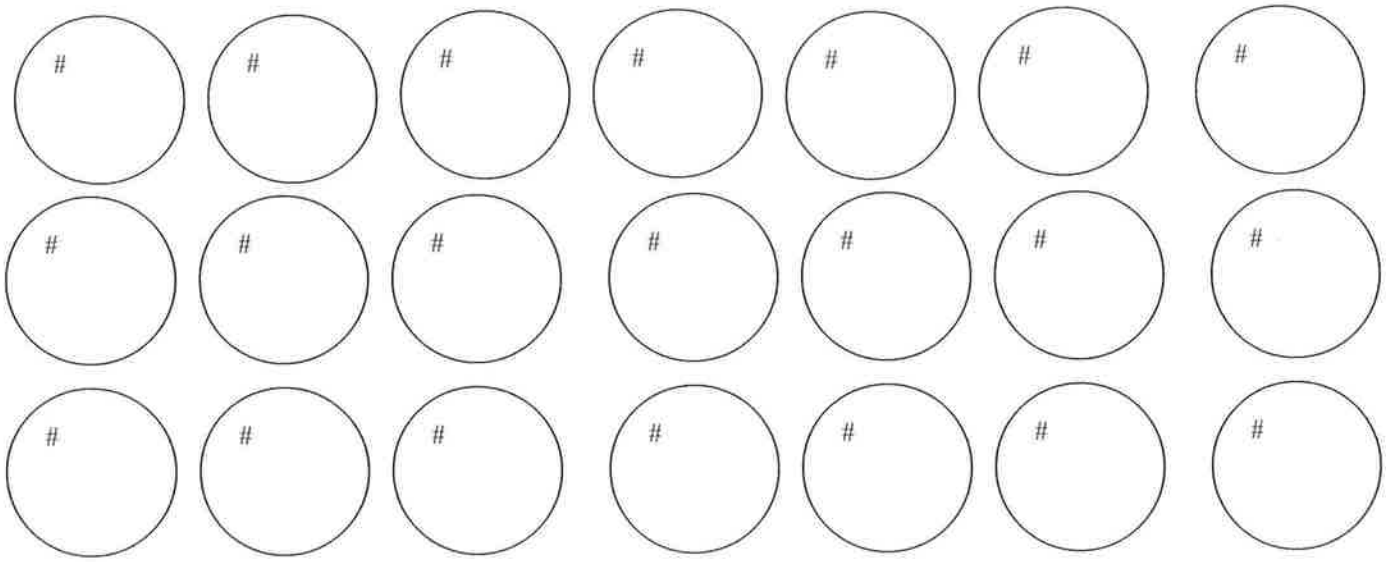
NSTAR ELECTRIC

IDENTIFICATION OF METER SOCKETS
Form M-13

Owner's Name _____ Date _____

Service Address _____ Work Order # _____

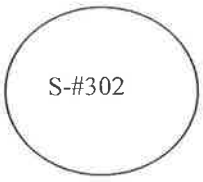
Town _____



NOTE: This form must be completed and returned before any meters can be installed. **EACH** meter position must be marked according to NSTAR/Electric's *Information & Requirements for Electric Service.* Labeling on this sheet must agree with the labeling on the meter sockets. Fill in the number of circles to correspond with the number of meter sockets

Section 708. Identification of Meter Sockets

Sample



Please complete and submit this form for each meter location for multi-unit buildings

Electrician _____ Telephone # _____ License # _____

Requested date of Meter Installation _____

Received by: _____ Date _____

Revised 03-15-06